The Builder.

VOL. LXXVI. No. 2932. APRIL 15, 1899.

ILLUSTRATIONS.

House, No. 37, Harley-street.—Mr. Beresford Pite, F.R.I.B.A., architect ..... *Double-Page Tone Block.*
Marine Palace of Varieties, Hastings.—Mr. Ernest Runtz, architect ..... *Double-Page Ink-Photo.*
New Sedilia, Choir Stalls, &c., St. Brelade's Church, Jersey.—Messrs. Rogers, Bone, & Cole, architects ..... *Single-Page Ink-Photo.*
Tower, St. Michael's, Woolwich.—Mr. W. D. Caröe, F.R.I.B.A., architect ..... *Single-Page Ink-Photo.*
Some Old Renaissance Houses in Nuremberg.—Drawn by Herr Theodor Eyrich ..... *Double-Page Photo-Litho.*

Blocks in Text.

Diagrams illustrating Automatic Telephone Exchanges ..... Pages 360-61
Palace of Varieties, Hastings. Plan ..... Page 370
Diagram illustrative of the "Harpur" Warm Lavatories ..... Page
Illustrations to Student's Column ..... „ 374

CONTENTS.

The Millbank Competition 359
Automatic Telephone Exchanges 360
The Genius of Turner 361
Notes 362
The London Government Bi 364
The Royal Institute of British Architects 364
Sanitary Inspectors' Association 366
Builders' Clerks' Benevolent Institution 366
Glue Testing 367
Architectural Societies 369
Archæological Societies 369
Engineering Societies 370
The Building Trade Dispute 371
Illustrations:—
House: No. 37, Harley-street 370
Palace of Varieties, Hastings 370
Sedilia Stalls, &c., St. Brelade's Church, Jersey 371
Tower: St. Michael's, Woolwich 371
Old Renaissance Interiors, Nuremberg 371
Competitions 371
Applications under the London Building Act, 1894 372
Trade Catalogues 372
Books Received 372
Correspondence:—
Public Baths 372
Harrogate Pump Room Competition 373
The Student's Column. Architectural Hygiene—XIV 374
General Building News 375
Foreign 376
Miscellaneous 376
Capital and Labour 377
Legal:—
The Putney Ancient Light Dispute 377
Decision as to Picketing 377
Meetings 378
Recent Patents 378
Some Recent Sales of Property 379
Prices Current of Materials 379
Tenders 379

The Millbank Competition.

THIS competition was promoted by the London County Council with the object, no doubt, of seeing if it were possible to obtain any fresh light from outside upon a difficult and hitherto unsolved problem. The question of providing soundly constructed, healthy, and sufficiently spacious homes for working-class families at rents within their means is no new one; both public bodies and well-known philanthropic organisations have for many years past attempted to deal with it. The claim is sometimes made that they have been successful, but such success is obviously only partial when it has to be acknowledged that the rents necessarily charged, if the other conditions are fulfilled, are beyond the means of classes below the comparatively well-paid mechanic. In so far as rehousing the thriftless slum populations disturbed by public improvements, the particular task imposed upon the County Council by law and elementary justice, is concerned, the effort has resulted in what can only be called absolute failure. Add to this that the problem becomes every year both more pressing and more difficult to solve; the increase in the value of land, the cost of building and our ideas of what are reasonably comfortable and healthy conditions of living more than counterbalancing the increase in the rate of wages; and it is no wonder that the Council, while having every faith in its own Architect's department, should wish to see if it could get any hints from the experience of others. Though no large measure of success could reasonably have been expected, the trial was worth making; indeed, it was obviously right it should be made. Many outside architects have experience of such buildings, and there was always the chance that one of the selected sixteen who accepted the invitation might, by applying his mind to the subject, become inspired with some happy thought that would throw fresh and valuable light upon it.

We have not seen the conditions and particulars supplied to the competitors; but the great variety of treatment in the seventeen designs submitted (Messrs. N. Joseph, Son, & Smithem sent two) shows that considerable latitude was allowed; and the fact that Mr. W. D. Caröe, who, if he has ever had experience of such buildings, is better known in other ways, and unlikely to have any fads or narrow or prejudiced opinions, was chosen as assessor, may be taken as evidence that the Council wished to give every chance to fresh ideas. It must, however, be confessed that a careful scrutiny of the drawings exhibited last week at the offices in Spring-gardens leads to the conclusion that those Councillors who had the most modest expectations are least likely to be disappointed. Not that any large number of the designs are other than good ones, but they exhibit no fresh ideas of any important or far-reaching description in the desired direction. The principal suggestions they seem to us to make are for a better and more architectural treatment of the exterior of such buildings, the abandonment of any attempt to make one stairway serve for more than two tenements on each floor, and the widening of the customary open-air passage or balcony to the water-closets into something more like a little open yard. This last suggestion is made by Messrs. Spalding & Cross, to whom the highest premium of 150*l.* has been awarded, the second premium going to one of Messrs. Joseph, Son, & Smithem's designs, and three smaller ones to Messrs. Howgate, Leeds and Keith, Mr. Dobb, and Messrs. Gibson & Russell, respectively.

The site is a shallow corner one with a long frontage to Earl-street on the west and a shorter one to a new street on the south. The north end is irregular, sharply inclined, so as to leave the back boundary much shorter than the frontage, and flanked, as we gather from Mr. Caröe's report, by high buildings which shut out light on that side. Most of the competitors have chosen the immediately obvious plan of putting a long range of buildings on the front, generally with a return wing on the south. Two at least have also added a short wing returned at an angle of about forty-five degrees at the north end, and two have suggested blocks at right angles to the long front. With one or two exceptions all make their buildings five stories high; but the amount of accommodation obtained is amazingly diverse, ranging from a minimum of thirty dwellings to a maximum of seventy. It need hardly be said that in the latter case, though great ingenuity has been displayed in the planning, the site is far too crowded and light and air deficient. Most of the plans provide, chiefly, three and two room dwellings, with a small scullery and cupboard for food, and an open "balcony" giving access to a water-closet, and generally also to the food cupboard and coal store. Most of the "balconies" are mere open passages from which, in many cases, the scullery obtains its only light and air. Some competitors have provided a proportion of single room and four roomed dwellings; five rooms even occur in a few plans, but in these cases the designs generally are better adapted to blocks of small flats of a superior class than to workmen's dwellings. Several competitors have tried to economise by making one staircase serve for three or four dwellings on each floor, and no doubt the economy is an important one; but the result has always been to complicate the planning or necessitate long, ill-ventilated passages. The provision of washhouse accommodation has received various solutions; some appear to have omitted it altogether, others provide it in the yard at the back of the site or elsewhere, others again put a small washhouse close to each staircase on every floor, and one puts a washhouse and a drying-room to each stairway on the roof, which is asphalted for use as a drying-ground. Whether the smuts from the surrounding chimneys would not make it a very undesirable place for hanging wet linen seems a question worth consideration.

Messrs. Spalding & Cross propose a long

block facing Earl-street, with six three-room dwellings and one two-room one on each of the five floors, separated by a passage 12 ft. 6 in. wide from a shorter one on the south front, containing four two-room dwellings on each floor, altogether fifty-five dwellings; and they show on flaps how to provide one more two-roomed dwelling on each floor at the north end of the long block if desired. This addition would be objectionable, as tending seriously to interfere with the otherwise admirable provision for the circulation of air round the blocks, but the assessor thinks even the fifty-five dwellings too many to put upon the site, and suggests their reduction to forty by omitting half the short block and the two-roomed dwellings in the long one. The simplicity and directness of the planning, and the provision of direct cross-ventilation everywhere are admirable. In the three-roomed dwellings the staircase, which serves only two on each floor, is on the front, next to it a bedroom with a passage beyond, and then the living-room of the depth of bedroom and passage combined. The second bedroom is at the back of the living-room and of the same width, which leaves the width of the first bedroom and half the staircase to be divided between the scullery and open balcony at the back. This is so arranged that both the stair and passage can be ventilated from the balcony, from which both the scullery and water-closet are entered. The latter is cut out of the corner of the former, and each gets a small window. The food cupboard, with a coal-box beneath it, is placed in a recess in the back wall of the balcony, well away from the water-closet. The door to the first bedroom opposite the passage window, and the door between the living-room and second bedroom, secure direct cross ventilation to all the rooms. The assessor objects to there being only an open iron railing between adjoining balconies, probably because the water-closet doors face each other; but, on the other hand, it has a great advantage over a solid wall in affording more light and air. The two-roomed dwellings are planned with equal simplicity and care in other respects, but it was apparently found impossible to make the balcony anything more than the usual open passage. Some objection might be taken on the score of economy of space to the long, narrow shape of the living rooms (16 ft. by 10 ft.) in both classes, but they are, after all, good, useful rooms, and the defect cannot reasonably be allowed to outweigh the other excellencies of the plan. The architects have allowed themselves one little extravagance in the shape of tile hearths to all the rooms. The elevations show quite an architectural treatment, very different from the usual commonplace, institution-like aspect of block dwellings. One's pleasure in them is somewhat marred on recognising that the party-wall runs up behind the middle of the unnecessary gable, and across the window shown in it; and we are probably still far from the day when such magnificent porches can be considered reasonable adjuncts to buildings erected with a view to strict economy; but both are mere incidents easily modified; the banishment of the fidgety little stripes of red bricks, the concrete lintels with their huge chamfers or roll mouldings, the heavy string courses, and all the coarse commonplaces associated in the mind with such structures, is much to be thankful for.

The design by Messrs. Joseph, Son, & Smithem, to which the second premium is awarded, is one of the two that have small blocks arranged at right-angles to the frontage, the other, which was sent in in an incomplete state, being, we believe, by Messrs. Archer & Hooper. In the former there are three symmetrical and rectangular blocks, and a smaller one of irregular plan filling the north angle of the site, all being four stories high only. The southernmost block contains twelve three-room dwellings, and the others together twenty-four two-roomed ones, making thirty-six in all. The number of rooms is thus very considerably less than in the first premiated design, namely, eighty-four against the 140 shown, or 110 if the assessor's suggested restriction were carried out. The air space round the buildings is excellent, and there is good cross ventilation within; but the planning in detail is less simple and straightforward than in Messrs. Spalding & Cross's design; the open balconies are all of the narrow type, and the sculleries and food stores get their only ventilation from the inner end of these balconies, on the outer ends of which the water-closets open. The external elevation of this design, though plain, is very satisfactory; the ends of the blocks have simple pediments, and the buildings are connected along the front by opened arched screens of good character. The assessor, however, very justly remarks upon the strange contrast between the architectural character of this design and that of the other submitted by the same architects. Messrs. Howgate, Leeds, & Keith appear to have obtained their small premium for their suggestion of washing and ironing rooms on the roof already referred to, and which appear as towers or turrets in the elevations. Mr. Dobb also seems to have gained his for the arrangement of his washhouses, which are entered from the half landings of the staircases and form projections in the rear of the block. He seems to have forgotten the necessity for cross ventilation in his dwellings. Messrs. Gibson & Russell's plan shows great ingenuity; an ingenuity chiefly brought out by the difficulties they have got themselves into in their attempt to make one staircase serve for four dwellings on a floor, and which they have nevertheless not successfully conquered. Their premium is a recognition of some charming external elevations.

Among the suggestions made by some unsuccessful competitors is one for a "common room," for the use of the tenants of the blocks, which is shown in the incomplete design before referred to, and one for "play-rooms" or covered playgrounds for children. The latter seems to have arisen from one of the competitors having originally planned three or four rooms which he afterwards found would not get direct light, and for which he had to find a use; but it seems worth noting. The only design which strikes out an entirely new line is that numbered four, which shows a long block of building with a corridor down the middle of it from end to end on each floor, and dwellings entered from it on both sides. The corridor and the rooms alike are insufficiently lighted and ventilated, and the sculleries, open to the air, with the water-closets opening from them, as well as other details of the plan, are very weak. The whole design is unhesitatingly condemned by Mr. Carõe, and as it stands no doubt rightly; but we do not feel quite sure that it may not contain the germ of a useful idea.

AUTOMATIC TELEPHONE EXCHANGES.

THE automatic telephone exchange which has been on exhibition at the offices of "The Direct Telephone Exchange Syndicate, Limited," 84, Winchester House, Old Broad-street, London, E.C., during the last few months, has perhaps not received the attention it deserves from the technical Press. One reason for this is that, owing to the necessarily very complicated electrical and mechanical apparatus employed to do the work of a manual operator, the details of the system are by no means easy to understand even with the help of elaborate diagrams, so that many engineers have been content to wait and see how the installations on this system, which are already in operation, will stand the test of every-day work.

We have received from the company a pamphlet containing a technical description of "The Direct Telephone Exchange," which explains very clearly the electrical part of their system. It is, however, too complicated for reproduction here, but we can recommend it to any one who has the time and ability to master the details of this marvellously ingenious system. The mechanical devices employed can only be properly appreciated by actually seeing them in action, as it is very difficult to tell from diagrams whether a mechanical appliance will act with certainty.

We will describe briefly the system as applied to a small exchange of one hundred subscribers; such an exchange, for example, as would be used for a small town or in a large office or hotel. The subscribers would be numbered from 101 to 199.

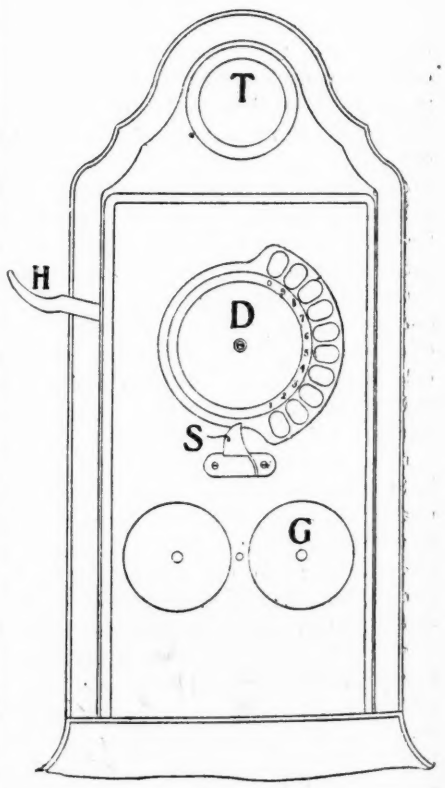


Fig. 1.

The instrument (fig. 1.) which each subscriber has is very similar to an ordinary

telephone set. In front there is a rotating disc D provided with holes numbered 1, 2, ... 0. Suppose that a subscriber wants to make connexion with No. 139. He inserts the tip of his finger in 1 and pulls the dial round until his finger reaches the stop S; he then lets it go, and it automatically rotates back to its original position. He next does the same operation at 3 and then at 9. This makes connexion between his telephone and that of No. 139. He now rings his magneto bell in the ordinary way, and if his own bell G rings at the same time, he knows that No. 139 is not engaged; if, on the other hand, his own bell does not ring, he knows that it is engaged. In the former case he takes his telephone off the hook H and talks into the transmitter T. Whilst he is talking with No. 139 it is impossible for any one else to ring either of them up. When the conversation is finished the mere act of hanging up the telephone on H moves their switches at the exchange back to the normal position and so leaves them both ready to be called up by any other subscriber.

It will be seen that all the exchange work is done by the subscriber himself, the time required to do it being only from three to five seconds. Again, as they are not at the mercy of the exchange girl, the conversation is absolutely secret, and cannot be interrupted except at the option of those talking.

From each subscriber's telephone two wires go to the central station, and the electric impulses that are sent along them operate the apparatus at the exchange. The mechanism of the dial on each telephone is not unlike that of the apparatus used in messenger call systems. Turning round the dial winds up a spring, which, as it runs down, operates a toothed wheel, and so sends a definite number of electric impulses along the line. The tension of the spring admits of easy adjustment, and there is a governing arrangement to regulate the speed. At the exchange there is an elaborate switch for each subscriber, which he alone can operate by his dial, and only when this switch is in its normal position can he be called up. Although highly elaborate, the design of this switch is sound, and occasional attention from a mechanician would be sufficient to keep it in thorough working order. Part of it consists of a concave surface (fig. 2) formed of plaster of

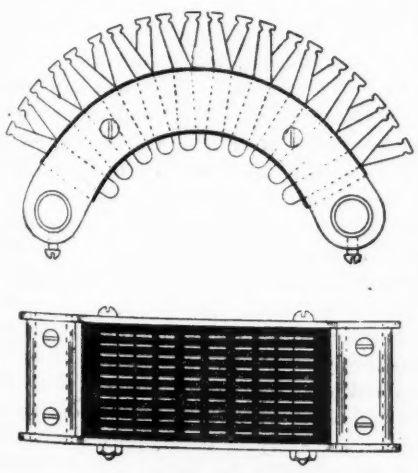


Fig. 2.

Paris in which is embedded a number of contact pins corresponding to the number of subscribers, each of which is in connexion with a subscriber's wire. In the figure part of one of the hundred switches in a hundred exchange is shown. It will be seen that there are ten rows, and ten contact points in each row. The arrangement of the contact pins in the insulating material is also shown. In the axis of the cylinder of which this surface is a portion there is a rotating axle carrying a radial contact piece or wiper, which can be made to have contact with any of the contact pins. The first current impulse sent over the line brings the wiper into position, one tooth behind the first pin. The second series of impulses raises the rotating axle so that the wiper comes opposite the required tens line. In the case supposed it would be raised so that it was opposite the third row. The third series of impulses rotates the shaft bodily, so that the wiper comes in connexion with the ninth pin on the third row. The subscriber is now through to No. 139. The fact that these two are in talking connexion does not interfere with the other subscribers, except in so far that neither of them can be called up by any one until they have finished their conversation. It would be quite possible for ten or twenty different calls to be accomplished at the same time, as the action of each switch is practically independent, and the accumulators at the central station can supply a large current.

The automatic exchanges are built in three sizes; the first includes the 100 and 400 system in which only a single switch is used for each subscriber. The second and third, which are for 1,000 and 10,000 subscribers respectively, need two switches per subscriber. In the larger exchanges the "bridging system" is used. In this the electro-magnets do not form part of the talking circuit, and so they can be made of relatively high resistance and consequently can be operated by a smaller current. In the ordinary exchange each subscriber takes about 0·5 of an ampere to operate his switch, but when the bridging system is used 0·2 of an ampere is ample. To give an idea of the size of each switch, it may be mentioned that in a 200 exchange each switch occupies a lineal space of 12 in. by 4 in. and projects 6 in. from its base. It is stated that a room 40 by 45 ft. in floor space is large enough for a 5,000 exchange. It is also stated that one man can look after a thousand instruments. When it is remembered that in an ordinary manual exchange one operator can only attend from 50 to 100 subscribers, there is an obvious economy in labour.

We are inclined to think that there is an immediate future for this system for exchanges for small towns or large establishments. It is in use at the White House in Washington, and in some of the Government buildings in America. At Berlin, also, the German Postmaster-General is making an installation of 400 in the public telephone system. It is said that the cost of an automatic exchange is not much greater than that of an ordinary exchange fitted with manual boards, and for large exchanges that it is even less. Some exchanges in America have been in operation nearly five years, and some are in process of erection having a capacity of 5,000. It is time, therefore, that some data as to the cost of repairs and maintenance were forthcoming.

Besides the saving in wages there are other advantages in an automatic exchange. It is open night and day, and equal facilities are given to all, so that there could be no grumbling amongst the subscribers about unfair preferences. The question also has an economic aspect. In the near future there will probably be a large increase in the number of telephone exchanges in this country. As a large exchange often employs a hundred or more girls, the adoption of automatic exchanges would be a great hardship to many of them who are expert manual operators, and would deprive thousands of them of a livelihood. It is all the more necessary, then, that this automatic system should be thoroughly considered at this transition stage of the telephone industry.

THE GENIUS OF TURNER.

THE fine collection of works by Turner which was opened on Monday last at the Guildhall Galleries affords a very good summary, as it were, of the main characteristics of his genius, as the paintings in the large gallery, though only thirty-eight in number, include works representing both his later and earlier styles, and have been arranged as far as possible in chronological order.

The result is striking even in its general optical effect. On the one wall we see dark hill sides, foregrounds with no certainty of colour, and seas which in many cases have neither the colour, the movement, nor the consistency of sea-water. On the other wall is an iridescence of bright colour; calm waters bathed in rainbow hues, or storm scenes in which form and even distinct intention are almost lost in the whirl of the brush. Yet widely as these two phases of Turner's art, the early and the late, differ in aspect and in apparent aim, they have one quality at all events in common. None of them are really like nature; in other words, Turner was no realist—never any painter less so; although he has been falsely placed in that category. Whether in his early "brown" pictures or his later purple and golden ones his object was the same—to translate the poetry of nature into the poetry of art; to create a work of art out of the materials of nature. Turner was so far from being a realist, in spite of Ruskin's exaggerated statements about his extreme accuracy in details (statements which the same critic completely contradicts in other passages of his writings) that he continually altered the scenes which were the professed subjects of his landscapes, in order to produce from them what he considered a more striking picture than the original scene afforded: and he was right. His colour, too, is very seldom that of nature; it is a colour scheme of his own, worked out with regard to unity of pictorial effect. In regard to the works of his later period few persons would deny this; few can pretend that they ever see in nature such prismatic effects as Turner showed in these works; though Turner's reply to the objector who said that he never saw them—"Don't you wish you could?" is not without its point. But this arbitrary choice of colour for purposes of effect is really quite as recognisable in the early works of the "brown" period as in the later works of the prismatic period. Look at the grand picture of "Conway Castle," for instance (No. 6 in the Guildhall collection); of what material is the foreground? We know it is meant for an expanse of sea-shore; but it has neither the

colour nor the consistency of an expanse of shore as seen in nature. It is a foreground tone which suited Turner's scheme. What is called "local colour" he constantly either ignored, or treated just as it suited the general scheme of his work. Look again at the rather later middle period work, "Somer Hill," a lovely scene in a watered park with the house at the top of a rising lawn beyond; it is an ideal expression of the calm and repose of such a scene on a warm summer day; it conveys fully the sentiment of the subject. But compare it with nature. Is the lawn opposite the colour of a grass lawn? Does the water present the contrast of colour with it, which would be presented by calm water under a calm sky? Certainly not; the tones of lawn and water are assimilated; Turner wanted artistic unity, and the local colour of nature is sacrificed to it, as is the case over and over again, in the works of his earlier period especially. In the later works the process was a different one; it was not a subtraction of natural colour but an addition of more colour than really existed in the scene; but the object was the same, the achievement of the pictorial effect desired. In the later works he produced what may be called brilliant coruscations of effect; in the earlier ones he produced unity of scheme for the picture; he sacrificed some of the details of nature, but he secured the quality of breadth.

In the popular estimate we are inclined to think that the works of the earlier period are under-estimated by comparison with the later ones. People are in the habit of thinking of Turner as a painter of wonderful rainbow-like sunlight effects, but many of the soberly-coloured paintings of the earlier period are grander and more complete in style than most of the later ones. In the water-colour gallery at the Guildhall there is a striking contrast between the "Falls of the Clyde" (125), a large water-colour of 1802, and the "Swan's Nest" (124) a work of about the same size painted in 1816, and hung above the previously-named drawing. This is the middle period, but it foreshadows a good many of the characteristics of the later period—the love of warm and brilliant contrasts of colour, of reflected lights in water, &c. The Clyde picture is a work in what one may call a dark key; there are no brilliant contrasts in it, and probably there is hardly any part of it which is really the colour (or the apparent colour) of the natural hills, rocks and water. But its values are all right in their proportions, and the whole forms a grand monumental landscape, a complete pictorial whole in which there is nothing to disturb the unity of effect. No one with any eye for landscape art, we imagine, would hesitate for a moment in ranking it as the far superior work of the two. The "Swan's Nest" is a charming and seductive work; the "Clyde" is a grand one.

Among these monumental landscapes of the earlier period "Kilgarran Castle," which comes first in the order of hanging, is one of the finest, and one of those which best illustrates Turner's abstract treatment of nature. Is the replica of it (No. 3) really by Turner? It is said to be painted in the same year (1799), but it seems almost impossible that Turner could have painted practically the same picture in the same year in so different a manner. The No. 3 looks to us like No. 1 with the poetry taken out of it. Still it may be argued, no doubt, that a copyist would have tried to copy the tone of the original sky more closely. Among the other early works the "Trout Stream" is remarkable for the grand opposition of the mass of white cloud and the dark hill, as well as for the retreating perspective of the distance. Turner's distances in this sense are among the most remarkable points in his works; they seem to go back and back, in plane after plane, so that one loses sense of the restrictions of the picture-plane. There is no finer example of this than the distance of the "Mercury and Hersé" (20), in every respect one of the greatest works of the middle period.

It cannot be denied, on the other hand, that Turner's seas are mostly bad, sometimes very bad. They have neither the movement nor the colour of sea-water, for the most part. He treated the waves just as he wanted them for the composition; heaping up an arbitrary wave to balance a boat on it, or digging an equally arbitrary hollow in it, as in "Boats carrying out anchors" (8). The worst of the seas in the collection is the "Wreck of *Minotaur*," which is no more like sea than if it had been done by a French painter. And yet, if we compare some of these pictures with Stanfield's large painting in another room at the Guildhall ("The Morning after the Gale"), while Stanfield's sea is much more like sea, one cannot help feeling that the whole thing is prosaic in comparison; there is a demoniacal element in the Turners which is wanting here. Stanfield painted ships better; Turner's boats generally are very bad—almost impossible; he had however a feeling for the majesty of the great sailing men-of-war of his day, and knew how to make them sit on the water, though he could not do so with the row-boats, which always look as if they were sinking. The painting showing the *Victory* tacking up channel, taken (after the manner of the old masters) in three different positions in the same picture, is a striking example of this.

The collection of water-colours at the Guildhall is perhaps a more extraordinary illustration of the variety and intensity of Turner's genius than even the oil paintings. There are a number of landscapes here which deserve the title "sublime" for everything but their size; and the variety of achievement is so wonderful too. That the same artist should have produced the delicate little vignette-like pictures of "Nemi" and "Narni" (111, 112), and the "Snowdon" and "Cader Idris" drawings, with their solemn and almost tragic power, shows an extent of range in which Turner stands alone among landscape painters. The early architectural water-colour drawings, again, such as the Chapter House and the Lady Chapel at Salisbury (105, 109), are no less remarkable for precision in drawing architectural detail and for the perfect knowledge of perspective which they display.

We cannot but regret that the catalogue should have been so full of quotations from Ruskin's exaggerated and untenable statements. It is absolute nonsense to say of the "Ivy Bridge" picture that the "rock foreground is altogether unrivalled and remarkable for its delicacy of detail"; there is little or no detail in the rocks, and nothing of realism; there is as much as Turner intended, no doubt, but not as much as Ruskin implies. It is absurd to say that in the "Ehrenbreitstein" the admitted alteration of Turner of many of the details of the scene "gives a truer impression of the place than could be gained by the most accurate study from a particular point of view." It was not Turner's object to give the topography, but to produce a work of art. It is a pity this kind of nonsense is put in the hands of the uninstructed portion of the public to whom the galleries are open.

The supplementary portion of the collection at the Guildhall includes a very fine portrait group of three boys by Raeburn; one or two good and well-known works by Reynolds; several fine Gainsboroughs; an exceptionally fine example of Linnell's rather restricted genius; a good small Venice picture by Holland, and a large one by David Roberts—careful but hard and unsympathetic; a beautiful Diana and Endymion by Etty—the poetry of the nude; contrasted with the prose of the nude in Mulready's learnedly painted but absurdly vulgar and bourgeois performance "Bathers Alarmed"; the only nude, we believe, that Mulready ever painted as a finished picture, although of course, his chalk life studies are numerous and celebrated. He is an example of the fact that an artist may be a splendid draughtsman of the figure, and yet have no feeling for its capability as a means of poetic expression.

We may thank the Committee, and the owners of the pictures lent, for an exceptionally fine and interesting exhibition.

NOTES.

The Building Trade Dispute

THE result of the conference between the Master Builders' Association and the Operative Plasterers' Association is to be deplored, and the immediate cause of the failure of the parties to settle the dispute is noteworthy. The officials of the Plasterers' Union having expressed a desire to meet the employers to settle the dispute if possible, the masters agreed to the conference, and there appeared to be some reason to hope that an irritating and wasteful dispute would be brought to an end. The representatives of the men, however, appear to have taken up a surprising attitude in regard to coercion—an attitude which, though the men's statement is ambiguous, appears to be practically a withdrawal of their assurance on March 24 that they had no desire to coerce any one into their Society, but merely claimed the right to "persuade." As it was this assurance which induced the masters to accede to the request for a conference, it is not surprising that the conference ended so unsatisfactorily. It is much to be hoped that all employers of plasterers, especially those who may have hesitated to associate themselves with the Masters' Association, will realise what the withdrawal of the assurance of March 24 means. It means, apparently, that the Plasterers' Union is pledged to an outrageous policy of coercion, the end of which is to force all the operatives to join a society in order, presumably, that that society may be better able to dictate terms to the employers. This being so, a settlement of the dispute does not seem to be possible at present; for, apart from other practices complained of, the masters are scarcely likely to give way on this important matter of coercion.

St. George's Tower, Liverpool.

As the Birmingham people have just removed the tower which was the central object at the junction of several of their principal streets, so Liverpool seems to wish to remove the tower of St. George's Parish Church, a fairly good tower and spire of the Classic type, which forms the central object at the head of the principal line of street. It appears that the church is no longer required for its purpose, but it is to be hoped that those who advocate the retention of the tower as an architectural object will be listened to. It is a foolish thing for a corporation to recklessly destroy architectural monuments which form part of the character of their city, and which are moreover landmarks of its past history. A Liverpool gentleman, Mr. Henry Peet, proposes to retain the tower and put an arcade or shelter round the lowest story; the sketch of this is published in a Liverpool paper. Having regard to the general character of the erection, it should be a colonnade, not an arcade, and not with a sloping lean-to roof, as shown in the sketch, which would look very bad. With a different treatment a good effect might be produced. We hope the tower will be preserved, at all events.

King Alfred Memorial at Winchester.

LORD R. S. GOWER having, in a letter to the *Times* of the 5th inst., proposed the erection of a half circle of pillars on the farmyard near the site of Hyde Abbey, Mr. Alfred Bowker writes to the same paper on the 10th inst. and points out that this farmyard stands upon the site of the Abbots' House and other conventual buildings built centuries after the great King's death. He adds that, although the erection of a cross in the centre of the roadway which now occupies the site of the centre of the Abbey Church would be quite feasible, any erection such as that suggested by Lord Gower would involve the clearance of the small modern houses from the neighbourhood, the purchase of which would probably run into many thousands of pounds. Quite apart from this pecuniary consideration, it is a question whether a "half circle of pillars" would be altogether an appropriate monument to the King. Without discussing the date of Stonehenge or many other "standing stones," of which there appear to have been plenty in Saxon times, such stones are usually connected with pagan heroes, and the allusions to them in Saxon charters seem to imply that their origin and purposes were but imperfectly understood. Alfred should not be confused with our British kings of an earlier period. From an architectural point of view, moreover, pillars should certainly support something. A complete building does not appear to be contemplated, and we cannot help our thoughts recurring to the modern ruin on the hill near another Saxon city in the North. It should be borne in mind, too, that the abbey actually founded by Alfred was not at Hyde, but in the city near the cathedral. It was known as the "New Minster," or St. Grimbald's. In 1110, owing to the flooding of that site, a new abbey was built at Hyde just outside the city walls. This was burnt soon after and rebuilt in about 1180. From this time a new era appears to have commenced, and the monks became one of the wealthiest communities in the county, so that their old designation and site was almost forgotten when allusion was made to the Abbey of Hyde.

St. Bartholomew's, Moor-lane.

THE Vestry of St. Giles, Cripplegate, have agreed to a scheme that has been prepared for effecting a union of the benefices of St. Bartholomew, Moor-lane, and St. Giles, Cripplegate. In pursuance of the scheme St. Bartholomew's church, at the corner of Tenter-street, is to be pulled down, and the proceeds of the sale of the materials will be devoted to the formation of a new ecclesiastical district in the metropolitan area, with a church of that dedication, the first incumbent of the united benefices being the present Vicar of St. Giles. The church was built 1849-50 by Professor C. R. Cockerell, R.A., after the sale for 483*l.* 15s., on January 4, 1841, of St. Bartholomew's-by-the-Exchange, which had been rebuilt in 1438, and was repaired by Wren after the Great Fire at a cost of 5,077*l.* The site of the latter was taken for widening Threadneedle-street, concurrently with the erection of the Royal Exchange (by Tite), but a portion of it is occupied by the Sun Fire Insurance Office; it is said that the church's south wall and a small chapel were incorporated in that company's offices, of which, as originally designed by Cockerell, we published a drawing by Mr. J. J. Joass on July 11, 1896. For the church in Moor-lane Cockerell used some of the carved masonry, together with the organ (by Bridge), the pulpit and woodwork, of the former church, and there he re-erected the old tower with the parapet—after a somewhat singular design—added to it by Wren.

Rolling Loads on Bridges.

THE March number of the "Proceedings of the American Society of Civil Engineers" (Vol. xxv., No. 3, 1899) contains an elaborate paper, entitled "General Criterion for Position of Loads Causing Maximum Stress in any member of a Bridge Truss." Assuming a train of locomotives, with wheels variously loaded, on a bridge, the object of the paper is to determine in what positions the most heavily loaded wheels should be placed in order to obtain a maximum stress in any member of the main girders. This is one of those papers that are quite impossible to summarise into a Note, with any fairness to the author. It would be necessary to repeat the whole to make it intelligible to our readers, and therefore should be read in the original by those interested in the subject. The methods used by the author to find the desired result seem to be more cumbersome than those generally adopted by engineers in this country. And it is doubtful if the additional accuracy, if any, obtained by the processes suggested is of any practical importance. The only really satisfactory method known to us is to roll a train over the bridge, and from the tabulated results so obtained, pick out the maxima stresses, both direct and alternating, on each and every member of a girder.

The Moat of Winchester Castle.

A WRITER to the *Times* of April 10, who signs himself "Indignant," refers to the probable annihilation of a portion of the ancient moat of Winchester Castle at the hands of the speculating builder, and asks if the Corporation can do nothing to save it, adding, "unless they do, I fear we Londoners who take some interest in King Alfred's Millenary will begin to look askance and suspect the apparent love of Winchester for things antique." It is certainly a matter for regret if such an old landmark is likely to be lost, but many lovers of the old Wessex city will probably have recollections of a goodly number of the relics of bygone times which the Wintonians have contrived to preserve, so that the suspicion of "Indignant" may be unfounded. If he had followed the course of the moat a few hundred yards southward from the part to which he alludes he would have seen the west gate, dating from thirteenth century, which has been carefully preserved and quite lately converted into a museum and opened free to the public by the Corporation, in striking contrast to the Corporation of Southampton, which was only prevented by public opinion aroused all over the country from destroying their somewhat similar Bargate. If the Corporation of Winchester had themselves sold the site to the builder they would most certainly be blameworthy; but probably the only way to save such relics is to purchase them, and auditors of corporation accounts are not generally credited with antiquarian sympathies.

Little Cairnie Hospital Competition.

THE instructions to architects for a competition for a new infectious diseases hospital to be built at Little Cairnie, near Arbroath, afford another example of the want of consideration with which architects are treated in these matters. The Committee "reserve the right to obtain the assistance of an architect of standing not a competitor," in adjudicating on the designs, "but do not bind themselves to do so." Following on this is the following reassuring paragraph:—"If the author of any premiated plan is selected and appointed to carry out the erection of the hospital (though the Joint Committee shall not be bound to employ any of them, but may employ any of the other competitors or any outside architect), it is understood that he will receive the usual commission of 5 per cent. on the specified cost, but that this shall include the premium and be in full of all charges and expenses except as may be specially allowed by the Joint Committee." We do not think there will be any good competitors under these conditions.

Beverley Minster.

IN reference to a remark in our review of Mr. Hiatt's book on Beverley Minster that the piers of the eastern crossing may have been built as designed, and pared down and altered afterwards, Mr. J. Bilson writes that "considering the projection of the ordinary clustered pier in the choir, any 'paring down' would have cut into the rough centre of the wall, and show in the work as left, which it does not; so that if 'pared down,' the piers must also have been refaced, in which case the jointing of the masonry would have shown traces of the process, which it does not." Mr. Bilson, who has special knowledge of Beverley Minster, also wishes to correct Mr. Hervey Rutherford's remark, in connexion with his drawing of the western towers (published in our last issue), that the towers, "like the rest of the structure," are built of Tadcaster stone." Mr. Bilson states that though the nave and western towers are of Tadcaster stone, the eastern arm—choir and transepts—is built of an oolitic stone from Newbold.

Mr. Elihu Vedder's Exhibition.

WE suggested before that the work of Mr. Elihu Vedder, the American artist, was perhaps regarded as more important, owing to the serious character of the subjects, than it could claim to be on purely artistic grounds. The exhibition of his thoughtful and often exceedingly poetic designs at Messrs. Dowdeswell's Gallery entirely justifies this suspicion. Mr. Vedder, of whom the American magazines speak as if he were a kind of United States Michelangelo (American magazines have that way with them), is a book illustrator, and a black and white artist, not a painter. There is a great deal of imagination and feeling in his conceptions, but they are only works of the illustrative order; the few figures which have been painted on a large scale are hard in style and not beautiful in design. Those who enjoy black and white designs which express original thought will find much to interest them in the exhibition at Messrs. Dowdeswell's. We only object to their author being claimed by his compatriots as a great painter.

M. La Touche's Exhibition.

M. LA TOUCHE, on the other hand, is emphatically a painter; he composes with colour as a musician does with sounds, but he lies under the restriction that his subjects are mostly only vehicles for colour effect. Occasionally we have a sketch like "Le Ravissement d'une Etoile," which is a really powerful piece of grouping as well as of colour, but in general the figures indicated (and sometimes little more than indicated) in his pictures are of little interest in themselves: they are colour vehicles. In this sense some of the works at present on view at the Fine Art Society's gallery are very beautiful and original. We may mention especially the harmony of colour in "The Swans," which is perfect; but it is a style of painting which is limited in its interest. Those, however, who do not know this artist's work will do well to cultivate what may be called a new sensation in art.

The New English Art Club.

THE new English Art Club does not seem to advance; even from its own point of view there is no picture of pretension or importance in this exhibition. We notice that Miss Fanner has been promoted from her position by the door to the centre of the top wall, as her talents demanded; and her "Yorkshire Trout Stream" is a landscape with a large style and manner about it. Mr. W. W. Russell's "A Picnic," and one or two others, are good sketches for pictures. If Mr. Wilson Steer's landscapes are worth hanging in an exhibition, there is hope for all of us. Among better landscape sketches are Mr. Rich's "Rye" and Mr. Carter's "Millpond, Swanage," and Mr. Priestman's "Buttercups Bloom." Mr. Tonkin's society subjects are also promising—as studies for pictures: and Mr. Sims's "Love and the Student" is dramatic, if not very serious.

ALTERATIONS, &c., LUDDENDEN PARISH CHURCH, YORKS.—A new organ has just been erected in this church. The building has been redecorated throughout by Messrs. Bennett & Son, of Manchester. New heating apparatus has been provided, and the plumbing and glazing work carried out by Messrs. J. Naylor & Son, Halifax. Mr. John Robinson has carried out the plastering and the repairs to the roof. The whole work being executed under the superintendence of Mr. T. L. Patchett, architect, of Halifax.

THE LONDON GOVERNMENT BILL.

THE Council of the Royal Institute of British Architects have addressed the following letter to the First Lord of the Treasury in regard to Clauses 5 and 6 of the London Government Bill:—

"March 28, 1899.

To The Right Hon. A. J. Balfour, M.P., First Lord of the Treasury.

THE LONDON GOVERNMENT BILL.

SIR,—The Council of the Royal Institute of British Architects, viewing with some apprehension certain clauses in the London Government Bill which affect the architectural profession, desire most respectfully to draw your attention to various points set out below, of which they would urge your earnest consideration. In the first place, however, they would point out that the Royal Institute is the statutory body for the examination of District Surveyors, and that the Metropolitan Fellows, all practising architects, number 295, whilst further there are 545 Associates, all engaged in the work of designing and building in London, many of these being principals.

On behalf, therefore, of a responsible and representative body, the Council of the Royal Institute most strongly urge:—

1. That architects practising in London on behalf of their clients the public would have great difficulty in complying with the by-laws made by forty different borough corporations, and that wide differences in the administration of any building laws must ensue where there is not one responsible head as at present.

2. That it is of the utmost importance for the proper carrying out of the Building Act that District Surveyors should be independent surveyors, responsible only to a central authority, and not merely officials of a single corporation and, therefore, subject to control. And further, that the supervision of buildings should continue with them, and not be deputed to building inspectors under the control of a borough surveyor or engineer.

3. That architects having to submit their drawings for important and public buildings to the District Surveyors, strongly object to subject themselves to the direction of any one who is not a qualified and experienced architect, and independent of all local influences.

4. That the administration of the London Building Act, 1894, having worked well for so many years, there is no reason for any alteration. For such a purpose London must be treated as a whole, and, therefore, the rules applying to the other town corporations, which are quite apart from, and independent of, each other, cannot apply to these London corporations, which are merely parts of a huge metropolis.

5. That for the above reasons Clause 6 of the Bill be entirely omitted, and the powers under Clause 5 be strictly limited to matters which are local and not general.

6. That architects acting for their clients the public already labour under great difficulties in consequence of the very varied character of the sanitary and other by-laws at present issued and enforced by the Local Authorities in the London area, and that the London County Council, as the central authority, be empowered to issue to each proposed Corporation by-laws as to sanitary and other matters affecting buildings which shall be compulsory throughout the whole London area.

7. That no further splitting up of the laws affecting buildings in the Metropolis be allowed, but that rather all these be made uniform throughout the whole area affected by the Bill.—We have the honour to be, Sir, your most obedient servants,

(Signed) { WM. EMERSON, Hon Sec.
{ W. J. LOCKE, Secretary."

ELECTRIC LIGHT, &C., AT GRIMSBY.—An inquiry was held at the Grimsby Town Hall on the 6th inst., before Mr. W. A. Ducat, Local Government Board Inspector, into an application by the Grimsby Town Council for sanction to borrow 43,500*l.* for purposes of electric lighting, and 1,038*l.* for the formation of a new street connecting Guildford-street and Hilda-street. Mr. R. Smith (chief engineer from Professor Kennedy's office, London), the Borough Engineer (Mr. M. Petree), and the Assistant Engineer (Mr. Heap), gave evidence.

LONDON GEOLOGICAL FIELD CLASS.—This class, conducted by Professor H. G. Seeley, F.R.S., will commence its annual series of Saturday afternoon excursions on April 22. Full particulars can be obtained from the hon. sec., Mr. R. Herbert Bentley, 43, Gloucester-road, Brownswood Park, N.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE APPLICATION OF COLOUR TO INTERIOR ORNAMENT IN RELIEF.

AN ordinary meeting of this Institute was held on Monday evening at No. 9, Conduit-street, Regent-street, Mr. H. L. Florence, Vice-President, in the chair.

The decease of Mr. Edmond Egan, elected an Associate in 1880, having been announced, papers, under the management of the Art Standing Committee, were read on "The Application of Colour to Interior Ornament in Relief," by Messrs. H. Vaughan Lanchester and F. L. Jenkins.

Mr. Lanchester, who read the first paper, said that the question of form and relief was so frequently of first importance that he should deal with the massing and treatment both of colour and form when applied to internal decoration. Modelled work as a basis for colour treatment gave a solidity and strength that enabled the painting to be kept in a more delicate key than would otherwise be thought satisfactory. The relief also was helpful in connecting the work with the mouldings and forms around it in a way that no flat-painted work could do; and if the design of the whole interior was studied by architect and sculptor in conjunction, the result should be far beyond the very frequent method by which the architect leaves a space, here labelled "sculpture," or a panel there marked "painting." The sculptor naturally asked for as much freedom as possible, while the tendency of the architect's idea was towards formality and symmetry.

Of the spaces the architect usually put at the disposal of the decorator the frieze was the most interesting, and offered the greatest variety in its requirements; it might consist of simple repetition of somewhat severely conventional forms, or it might teem with variety when it illustrated the great events connected with place or people. The freize, however, was not always the most suitable form of decoration to adopt, and its comparatively uniform continuity of colour and modelling was not always what was most to be desired. A certain massing of either or both at intervals might, without cutting it up into disconnected panels, give the desirable suggestion of repetition to the freize, and at the same time suggest a sense of support or connexion between other portions of the whole design. This treatment suggested a greater degree of solidity and higher relief in the supporting or dividing portions, though the same end might be attained by giving them more severity of form. An uninterrupted frieze gave length to the surface on which it was placed by the horizontal stratified effect so obtained, and the more the frieze was cut up into sections, the less would the modification in proportion appear.

Vaults and ceilings gave exceptional opportunities to the sculptor, though he could rarely put into them work having the same human and personal interest that the vertical surface of the wall allowed, as in most cases the decoration must be of a more structural and conventional character.

With a view to suggesting the effects that could best be aimed at in various cases, the author went on to consider the actual methods of executing the work, and the most suitable colours and materials. The combination of relief with colour was not only valuable where the figure formed the basis of the design, but could also deal in an interesting way with decoration based on landscape, architectural, and other forms, varying according to the subject and the dependence placed on the relief and on the colour. If the scheme of decoration was suitable, a delightful effect could be obtained by using colour very sparingly, as mere suggestion—in ceilings for instance, where colouring should always be delicate, unless supported by very strong architectural forms. Interesting effects might be obtained where it is desired to embody existing pictures or sculpture in the decoration, such works giving a note as to treatment and colour.

Plaster Relief Work.

Mr. F. Lynn Jenkins, who read the second paper, observing upon the present craze for lavishly decorated buildings, said that each new hotel, restaurant, or place of amusement has to vie with and, if possible, go one better in point of extravagant decoration than its predecessor, and the architect must often experience the greatest difficulty in complying with his client's demands, and sometimes at

the expense of his own natural good judgment and taste. The necessity has arisen for a decorative material which shall above all be durable and easily cleaned, being permanently coloured to any key of brilliancy and enriched with metals. These properties are embodied in the material known generally as coloured plaster relief work, and should prove almost sufficient reason for its production and use.

With regard to the prevalent mode of decorating rooms in private houses, it is becoming more and more apparent how false a notion it is and how extremely difficult to get any satisfactory effect by papering the walls and hanging pictures upon them. The revival of the old method of designing and making such decorations as are required as part and parcel of the scheme of the room is a movement the influence of which is bound to be widespread by reason of its truth of principle, and also because even the unanalytical mind will grow to perceive its advantage without knowing why the use of coloured relief for such purposes would often be found most serviceable.

The author then described the material and method of its production, and the plan adopted in the working of reliefs by Mr. Moira and himself, working in collaboration. The relief work in question can in no respect be considered according to the usual laws governing bas-reliefs, but must be modelled strictly with a view to the reception of colour. The quality of the colour depends so much on the texture of the surface underneath that it requires not a little experience and many experiments to obtain good results. The peculiar properties of the material enables the painter to get a brilliant transparency of colour on some parts to contrast with the density of others, so that there are practically no limitations to handicap him. This plastic material has the additional merit of giving exact reproduction, even to the impression of a thumb-print in the finished cast. The panels are easily removable from the wall without damage to them. When the work is fixed complete in its position, it is carefully reconsidered with relation to its exact surroundings, and alterations can be easily effected if desired. Some special advantage is derived in coloured relief work by the collaboration of painter and sculptor. Each would exercise a wholesome restraint on the other, beneficial to the work, while the joint imagination of two minds should instil a greater degree of interest.

Mr. J. M. Brydon, as a member of the Art Standing Committee, proposed a vote of thanks to the readers of the papers. He said that the proper use of colour applied to ornamental work in the interior of rooms was a very difficult matter. There was not much difficulty, as far as his experience went, in getting good reliefs—good friezes, lunettes, sculpture modelled in low relief in plaster and surrounded with proper decoration; but after that was accomplished, the difficulty commenced when the decoration of a room was commenced to be painted and in some way preserved from dirt or the ravages of time. Mr. Jenkins had urged that in such work it was important for the architect to work in collaboration with the sculptor, or, at all events, with the idea that the interior ornament in relief would be coloured. He (the speaker) agreed that the painter and sculptor should work together; that was very well as far as it went; but architects were frequently called upon to treat and suggest the decoration of actual reliefs that had not been designed in collaboration and with this idea. The Art Committee of the Institute had an idea in view in arranging the subject for that evening, viz., how best to treat in colour an elaborate ceiling, which had elaborate decoration, sculptured panels, or frieze. Of course there was a difficulty, for the simple reason that the beauty of the sculpture depends on its light and shade and delicacy in modelling, which might become lost when one began to colour it. He did not say it was not possible—far from it—to accommodate the colour to such an extent that the delicacy of light and shade would be retained, at all events, to a certain extent; but one ran the risk of losing the delicacy of modelling and light and shade which were got from modelled forms. He did not propose to go into the question of the forms themselves, for that was not the subject of the evening, but he might add that all sculpture applied to architecture must, he thought, be treated conventionally. There must be a severity of form and line. Whenever they approached, or nearly approached, naturalistic figures, the difficulty was increased tenfold, both in modelling and in colour. The flowing lines of some of the examples before him were not, for instance, in strict accordance with architectural lines. Any one who compared the frieze of the Parthenon would see that the forms were not naturalised but conventional, and they accorded with the Greek architectural lines around them. A question for them was: What would they do with the frieze of the Parthenon if they had to colour it? That was the sort of problem, in a way, that they had to deal with every day. Such work was not done in collaboration and the question arose, how to treat it? He had looked at the specimens exhibited that evening and it seemed to him that the treatment of some of them was too restless for an architecturally decorated room: that was what he meant when he said that the lines must be more or less conventionalised. There was one thing which must have struck them in looking at ancient buildings, viz.: the magnificent use of gold, especially in ornament, such as caps, eggs and tongues, of leaves and cornices, &c. No amount of colour could give the same good effect as was got by solidly gilding the whole feature. In that direction ornament in relief should be treated: instead of using a multiplicity of colours, very few should be used, and in that way a broad effect could be obtained—a result which one sought after in decorated sculpture. The object was to get the work very broad, very simple, very stately, very strong in its lines and not at all naturalistic, and not at all confused or jumbled up. He submitted those remarks from an architect's point of view, because decorators were often glad to hear what an architect thought, as architects were glad to hear what decorators thought. He had not been reconciled by what he had heard to the way of treating a frieze such as was shown that evening; the ideal way had not been shown, nor, as he thought, quite indicated. It was interesting to hear an account of the actual production of plaster work, but the difficulty was to obtain a broad and stately effect such as was to be seen in some of the old palaces in Italy.

Mr. H. Rathbone (Della Robbia Pottery, Birkenhead) said there was nothing more objectionable than large masses of glazed coloured tilings, with a perfectly flat surface, though it seemed necessary now to get some material which would defy the dirt and smoke and retain its colour-quality and brilliance. The machine-made tilings of the chief manufacturers of the day were intolerable; and in order to make others with an interesting surface and broken colour the promise of support from the architects was an essential. Permanency in material was also a necessity. Coloured plaster was absolutely certain to suffer from the effects of time, although the surface of this material, so long as it lasted, and the variety and softness of colour which could be obtained, made it among the most attractive of all decorative settings for temporary purposes. Very fine effects might be secured by the utilisation of simple material in combination with richer material, such, for instance, as large surfaces of Candy's glazed ivory bricks, which were made in Devonshire. Such glazed work, used in discreet conjunction with brick, produced in architecture the same delightful sensation which was felt in a lesser degree from the shine and shimmer of porcelain and glass on a material of a different nature, such as the every-day white tablecloth. This difference in texture, and the variety of charming architectural effects of colour and quality, could be obtained by adapting materials of even the same colouring but different textures, such as enamelled terra-cotta used in conjunction with ordinary red brick. Very beautiful permanent effects could also be produced by the use of mosaic, such as Rust's, amid a green or white tiling introduced as panels in a wall, with accents of rich modelled and glazed ware. Adopting this attitude, with the condition that the decorative settings of glazed ware thus introduced yielded the right perspective of architectural, or one might even term it orchestral, effect required for the building in question, depending mainly on the creamy or light silhouetted outlines and masses against the simple coloured grounds; or, on the other hand, adopting the method of clearly mosaicked or patterned colour, there was little limit to the discriminative uses which the Della Robbian treatment, with colouring sympathetically adapted to our less sunless climate, could serve. The designs of leading sculptors working hand in hand with the architects, or simply the architects' own designs or suggestions, could be carefully and wisely interpreted to suit the potter's art, so as to insure the effect demanded by the architectural conditions. As an instance of this he might be pardoned for citing Mr. Collcutt's construction for the fountain in the courtyard of the Savoy Hotel, for which his pottery had supplied the ornamental treatment and colouring in glazed material, with a use of mosaic in the basin. Nothing more telling could be used in this temperate sense for wall-fountains for the street or restaurant, reredoses, friezes, dado bands of colour, mantelpieces, memorial tablets, tympani for internal or external purposes, &c. This was an art which positively had not yet been seriously begun in this country, though the effects to be obtained were rich and delightful and sufficiently economical in comparison with other methods. The work of the Della Robbias was as fresh to-day as it was when it emerged from the oven 400 years ago; but out of many specimens of coloured plaster he (the speaker) had seen, the colour had sunk in and deteriorated sadly within the last ten years. If glazed ware were made use of in a constructive manner, it ought to be of the simplest nature, and in the main undecorated. The examples of modelled ware taken from moulds and dipped into coloured glaze led to the insinuation among us of a machine-made art which must needs be highly distasteful to their artistic sense for its treacly quality over monotonous flat surface, but if the simple material made large use of had an interesting and broken surface, leading to a pleasant play of light, the effect of Venetian-like colour which could be got by judiciously introduced settings was infinite and delightful in its prospect.

Mr. E. W. Mountford, in seconding the vote of thanks, said that they were indebted, not only for the papers which had been read, but for the beautiful specimens of work which had been shown that evening. Perhaps Mr. Rathbone did not know that the frieze which he had criticised was only a model, and that the real thing was three times the size. Every process had its difficulties, and although the high glaze of the pottery would be better avoided if possible, yet, as Mr. Rathbone said, the glaze and permanence were better than no glaze and no permanence. A very considerable amount of conventional treatment was desirable both in modelling and colouring when applied to architecture.

Mr. J. D. Crace said that there was one point worth calling attention to, and that was, that in the works of Luca della Robbia and the great artists of the past the first idea was that their work should be expressive when applied to architecture, and that the ground, whether lighter or darker, should be so maintained and not mixed up with the subject. Whatever artistic merits there might be in some of the specimens to be seen in that room, the colour effect was confused and the relation of the work to architectural lines would be unfortunate. We were apt to concentrate our attention far too much on technicalities of production and to disregard large treatment. That had been the great misfortune in our greatest public building in London; every possible attention had been devoted to the technical method adopted, but the bold and definite treatment of the colour in relation to the expression of the building had been lost sight of. He always felt some regret when that Institute appeared to devote more attention to technical methods—which were comparatively of second-rate importance—rather than to the greater subject of the definite expression of surface and line. The methods of production in relief in fibrous plaster which had been described that evening were not new; they had been in use for the last thirty years. The question was how to find the talent necessary to express, so far as sculpture was concerned, the forms which were agreeable and harmonious in relation to the architecture. So far as the colour was concerned, the method employed should not only express the architecture, but should leave the form sufficiently definite to be recognised at the distance at which it would be ultimately seen.

The Chairman, in putting the vote of thanks to the meeting, said that in a city like London a great deal more study should be given to the use of some sort of glazed material to the exterior: with a less violent and aggressive glaze, there was ground to hope that we should see in our narrow streets and gloomy lines

of houses great improvement in this respect, though this would never be done by the use of panels or by a spotty treatment. As to the treatment of interiors, he had not been at all convinced from what he had heard that evening that a glaze of any kind was likely to be successful—still more so if used as it was generally done—in panels. It seemed to him that if a system of raised decoration were used, it should be in large, broad surfaces, so as to give, not a glaring or spotty, or even brilliant effect, except in exceptional cases, but rather an effect of old tapestry ; something quieter and homelike. Sharp reliefs and contrasts might be necessary for restaurants, theatres, and such places, but he did not think people would care to be surrounded all their lives by such work. It was a subject about which there was much diversity of opinion, and he had hoped to have heard some Owen Jones student (and there were several present) give some expression of opinion. There was an invincible shyness about the architect which kept him, as a rule, from expressing his views openly, however deeply he might feel.

The vote of thanks having been put to the meeting and carried heartily,

Messrs. Lanchester and Jenkins briefly replied.

Mr. Jenkins said, in reply to Mr. Crace, that he had a sample there of a material which was obtained by a method which was not quite the old-fashioned method that that gentleman appeared to think.

The Chairman announced that the next meeting would be the sixty-fifth annual general meeting, which would be held on the 4th prox.

The meeting then terminated.

SANITARY INSPECTORS' ASSOCIATION:

SEWAGE DISPOSAL.

AT the general meeting of this Association, held on Saturday, the 8th inst., at Carpenters' Hall, London-wall, after the election of new members and the other ordinary business, a paper was read upon "Sewage Disposal," prepared by Mr. D. Balfour, C.E. Mr. T. J. Moss Flower (Chairman of Council) presided. The leading principles of the various processes by which the important problem of disposing of the sewage of large towns had been solved or attempted were set forth in the paper under four categories, viz.—tidal, land, chemical, and bacteriological methods. The tendency of late years had been towards a fairly satisfactory solution of the problem, but there was no one method which could be applied universally because the varied conditions of localities necessitated varied methods of treatment. Towns fortunately situated—small towns on the sea coasts or the estuaries of tidal rivers—could fulfil the requirements of the Rivers Pollution Prevention Act of 1876, which was the Act usually applicable, with comparatively little expense, because it permitted the discharge of crude sewage at extreme low water where there was no danger of a reflux, and where the volume of dry weather flow and the tidal rise in rivers were sufficient. Towns on the upper reaches of rivers were required by the Act to render the sewage harmless by the best means available under the circumstances. London and Glasgow were examples of towns so situated, the sewage in the former case being treated with lime and sulphate of iron at the great Outfall Works at Barking and Crossness, while the resultant sludge is carried out to the open sea to be discharged.

In Glasgow, where, after being treated with lime, alumino-ferrio, and filtered through coke breeze, a good effluent remains, fit to be discharged into the Clyde. The sludge is dried, pressed, and sold for manure. Dublin and Newcastle are examples of towns discharging crude sewage into the tideway at low water. The oldest example of the land or natural treatment is to be found at Edinburgh, where the Craigentinny meadows (an area of 300 acres) have been manured with the town sewage since the middle of last century, or 145 years. In America, France, and Germany very successful land filtration experiments on a large scale have been made, and in these countries, as well as at Edinburgh, the crops raised are good, the effluents are sufficiently pure for fish to thrive in the streams that receive them, and careful observations have revealed no injury to the health of the population in the vicinity. The Local Government Board encourages the land treatment by offering loans at 3 per cent. interest where the plans of a Local Authority are approved. The treatment by chemical methods has been the subject of seventy or eighty patents during the past fifteen years, and a few of these have survived. The newest developments have been in bacteriological methods, in which the object is to liquefy the solids, or sludge, in crude sewage by means of the micro-organisms contained therein, without chemical treatment or direct application to land, but with ample purification of the resultant liquid. Of this class the methods of Dibdin and Thudicum are working successfully at Barking, Sutton, and Hampton, near the metropolis, and at Leeds. At Sutton the resultant liquid is used to nourish mint crops, and at Leeds carp are said to thrive in the effluent. At Exeter and Glasgow the septic-tank system of Mr. Donald Cameron is being successfully carried out. These tanks are intermittent in their action, but Colonel Ducat, R.E. (late Engineer to the Local Government Board) has invented a process of this class which is self-acting and has a continuous flow. This is in successful operation at Hendon, where gold-fish are found to thrive in the effluent. In the "Ducat" tank, instead of solid walls, the sides are formed of open drain pipes built in concrete with alternate layers of through-going pipes, by means of which air is supplied both laterally and vertically, so as to obtain continuous action, the use of valves being thus obviated, and a saving in the cost of supervision being effected. In winter heating arrangements are considered important. Among the most recent methods of this class referred to were those of Whitaker & Bryant, and Mr. Bennett (Borough Engineer), Southampton. The paper avoids comparisons between these various systems, because they are the subject of exhaustive investigation by a Royal Commission, which has paid visits to Exeter, Yeovil, Manchester, Rochdale, Chorley, Sutton, Doncaster, Bradford, and Leeds in search of evidence. They have employed experts of their own, and have just increased their staff of chemists and bacteriologists, among the experts to give evidence being the author of the paper. The opinion is expressed in the conclusion of the paper that, as the outcome of this investigation, public authorities will soon possess ample knowledge on all the means at present existing for the purification of sewage with simplicity, efficiency, and economy. A cordial vote of thanks was given to the author of the paper, who was prevented from attending to deliver his lecture personally through an attack of influenza.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION :

ANNUAL DINNER.

THE twenty-first annual dinner of this Institution was held on Tuesday in the King's Hall, Holborn Restaurant. The chair was occupied by the President of the Institution, Mr. Alfred F. Randall, who was supported by Messrs. Tabberer, Pennington, J. Randall, Downs, Foster, Hugman, T. Costigan, Green, and others, the company numbering about 300.

The loyal and patriotic toasts having been honoured (Mr. Downs proposing, and Major Marshall replying for, "The Navy, Army and Reserve Forces"),

The Chairman gave the toast of the evening, "The Builders' Clerks' Benevolent Institution." The Institution, he remarked, had been thirty-three years in existence, having commenced its life in a small but very useful way under the good direction of its founder, the late Mr. Thomas Peto Ward. The object then, as now, was the granting of pensions or temporary relief to decayed or distressed builders' clerks or their widows, and for the maintenance and education of their orphans. This object had been realised in a far greater degree, perhaps, than its founder could have foreseen—for in the first year (1868) that relief was given the amount so expended was 12*l.* 15s., while last year the amount was 504*l.*, and to this must be added 102*l.* working expenses. The total amount spent in relief since 1868 was no less a sum than 17,336*l.*, and this spoke volumes as to the necessity of such an Institution. Last year saw the largest sum paid in temporary relief, many most distressing cases presenting themselves to the Committee, with whom it was a *sine quâ non* to inquire into without delay the cases before them and to afford relief. The Institution was a most generous one, for it did not offer relief to subscribers alone, but had given to those who had not paid a penny towards the Institution, either to builders' clerks or their widows or orphans. But those clerks who had subscribed were entitled at any election to ten votes for each guinea they had given. He was rather surprised to hear that some clerks preferred to subscribe to the Oddfellows, or kindred societies, the advantage of which he could not see, for from these societies they derived benefit only when they were ill, though friends could draw some 10*l.* or 12*l.* to bury them. In this Institution, however, pensions and relief were given when a man was past his work, and the Committee, under their rules, were empowered to pay out a sum as much as 10*l.* in temporary relief. There were applicants now upon the books for relief and for pensions, and the number was increasing. There were at present twenty-one pensioners, two children at the school, and there was a vacancy for another duly elected builder's clerk's orphan.

Mr. T. Costigan then gave the toast of "The Architects and Surveyors"—two noble and most useful professions which were closely allied to the building trade. It was the hope, he thought, of every person connected with the trade that the ties between the two professions and the building trade should become closer and closer, for the interests of architects, surveyors, and builders were much the same Architects and surveyors would have an opportunity shortly of showing their practical sympathy with builders and those connected with the building trade. As to the three branches of the great trade of building, there was the architect, with his great experience—being often an artist and always a thinker ; the surveyor, who had to go into the details of mathematical calculations ; and the builder, who had to carry into actual fact the schemes of the architect and the surveyor. After hearing the facts which had been put before them, it was to be hoped that the members of those two professions and the builders would do their best to assist in the good work which the Institution was carrying out. The name of Mr. Tabberer was coupled with the toast.

Mr. Tabberer, in response, said that he believed there was a very good feeling existing between the members of the two professions, and builders and their clerks. Architects were very much indebted to builders' clerks for the manner in which they lightened the labours of architects.

Mr. Turnbull Tonkin then briefly proposed the toast of "The Builders," coupled with the name of Mr. W. Downs. Among all the trades of the country, there was none more important than the builder's, and notwithstanding the vicissitudes in that trade, it was interesting to notice how many businesses were handed down from father to son.

Mr. Downs having suitably replied,

Mr. J. Randall, Past-President, proposed "The Merchants." The welfare of the Institution, he said, largely depended on the merchants of London. He would like to see builders' clerks themselves support the Institution more than they did. There were about 4,000 builders' clerks in London, but not a tithe of that number belonged to the Institution. Builders' clerks would do better to join the Institution than any other society.

Mr. R. Barrett, in response, said that most builders' merchants did their very best to support the Institution, and they would continue to do so, as far as it was possible in these competitive times.

The remaining toasts were "The President," proposed by Mr. Costigan ; and "The Past-Presidents," proposed by Mr. E. Brooks, Treasurer, and replied to by Mr. R. C. Foster, Vice-President, both of whom spoke of the great loss the Institution had sustained in the death of the late Secretary, Mr. H. J. Wheatley, who had worked so hard in its interests.

It was announced during the evening that over 200*l.* had been subscribed by the guests towards the funds of the Institution, the Chairman's list amounting to 111*l.*

ABERDEEN CORPORATION TRAMWAYS.—The following contracts for works on the Woodside section have been accepted :—Laying permanent way, Messrs. McAdam & Sons, Aberdeen, 18,085*l.* ; overhead line construction, cars, switch-boards, instruments, &c., Messrs. McCartney, Macelroy, & Co., London and America, 7,793*l.* ; feeder, pilot, and test cases, British Insulated Wire Company, 5,340*l.* ; total, 31,218*l.*

GLUE TESTING.

BY S. RIDEAL, D.SC.LOND., F.I.C.

Chemical Examination.

THE determination of water and ash is necessary in order to render the other results comparable, and to assist in detecting adulteration. Ordinary glue of good quality contains from 12 to 18 per cent. of water: a low result is generally a bad sign, as overdrying is known to injure the tenacity, while a high percentage diminishes the keeping qualities, besides adding spuriously to the weight. The ash is usually from 1·5 to 3 per cent., and its amount does not discriminate between hide and bone glues. It will obviously be much higher if mineral fillings have been added or the source is impure. The qualitative examination of the ash on the other hand, gives a clue to the origin, as the ash of bone-glue fuses, its solution is neutral, and it contains both phosphoric acid and chlorine, whereas ash of hide-glue does not fuse, because it contains lime; it is alkaline, and nearly or quite free from chloride or phosphate.

After breaking in small pieces, a sufficient quantity of the glue is either reduced to shavings in a machine, or is pounded in a mortar, the pestle passing through a perforated cardboard guard to prevent scattering. One or two grammes of the coarse powder weighed in a platinum dish are dried first in the water oven, then at 110—115 deg. C. till the weight is constant. The loss is water plus a small quantity of other volatile matter. Cautious incineration at a low temperature gives the ash, which should dissolve almost completely on warming with dilute nitric acid, the solution being tested for chlorides and phosphates, and also for other substances if necessary. The presence of more than a small amount of salt deteriorates the quality and appearance of glue. An excess of chlorine may also indicate that chloride of lime has been used as a bleacher in the manufacture. In a number of patents various earthy powders are added to glue during manufacture with the object of increasing its adhesive properties. This is regularly the case with Russian glue. White lead, lead sulphate, zinc oxide, barium sulphate, and even lead chromate have been used. These substances would be found in the ash.

Reaction of the Glue.—If acid, about 10 grammes of the powder are dissolved in warm water and divided into two portions; in one the *total acidity* is estimated by standard alkali, the other is evaporated on the water bath, redissolved, and the *fixed acidity* determined. The difference gives the *volatile acids*. As the nature and amount of the acids present in glue is often of importance, a closer examination may be made by distilling 30 grammes in 100 cubic centimetres of water by a current of steam, when the volatile acids will pass over. The distillate should be examined for free sulphurous acid, as it is sometimes present, having been used for preserving or bleaching, and its presence is generally objectionable. In leather glues the volatile acids are about 0·02 per cent., in bone glues from 0 to 0·5, the higher amounts, with a smell of acetic or butyric acid, indicating that the jelly has been soured during the manufacture and that the glue is unsuitable for many purposes. Kissling states that glue solutions which do not alter litmus may yet react with phenolphthalein, "probably owing to an organic acid." He estimated this with soda, but did not ascertain its nature.

Any undue quantity of acid can be roughly detected by the taste. Glues may be *alkaline* from the addition of excess of lime in the manufacture to correct the sourness of the jelly. A large manufacturer informs us that "a little acid or a little lime does not hurt, though it is much better neutral. We find that our customers prefer a glue that shows a little lime, rather than any acid, although an acid-made glue is not nearly so apt to decompose as a lime-made glue." It must be remembered that the bacteria which cause the changes are antagonised by acids. For uses where colours are concerned the glue must be neutral to litmus; for adhesive uses this does not matter, unless it is due to defective preparation. When the solution of glue in hot water rises higher than 100 deg. C., it begins to sour, and loses to some extent its property of forming a jelly. Sulphurous acid and sulphites are said to cause light patches on dyed wool. Kalmann states that the amount of sulphite can be determined in the remains of the acidity titration with soda and phenolphthalein, by means of iodine solution and starch, the organic matter not interfering. He mentions that for woollen manufacturers the glue must not exceed: free acid equal to 1 per cent. Na_2O, SO_2 0·5, ash 3, water 15 per cent.

Insoluble Matters.—As extraction with water, filtration and weighing is somewhat tedious, a comparative result may be obtained by dissolving 30 grammes, making up to one litre in a graduated cylinder with hot water, allowing to stand in a warm place for twelve hours, then noting the volume of the deposit as "foreign matter," stating the quantities taken. The solution may be used for other tests.

Determination of Gelatine.—The organic matters of glue are very complex. Among the nitrogenous matters to be found in it there are probably several varieties of gelatine and chondrine, as analyses of these substances, presumably pure, show differences in elementary composition, in addition to the variations in physical properties. Products of change, such as albumoses and peptones are usually present, with small quantities of bases, sugars, and ill-defined bodies. For this reason the content of nitrogen and the various processes of precipitation by tannin, &c., yield results which have little relation to the commercial value. Gelatine has a greater power of adhesion and gelatinisation than chondrine; the latter, however, is largely employed for size.

The Bisler-Beumat method of tannin titration is briefly as follows:—Two solutions are prepared; (*a*) 10 grms. of pure tannin to the litre; (*b*) 10 grms. of pure isinglass and 20 grms. of alum to the litre. The latter is added to a measured quantity of the former till no further precipitate is produced; the volume used is read off on the burette. The same volume of tannin is then precipitated by a 1 per cent. solution of the glue; the relation between the volumes of glue solution and of isinglass gives the ratio of the glue to the sample of isinglass taken as a standard. Different specimens of isinglass and of tannin themselves show different ratios of precipitation; 42·7 parts of gelatine are said to be equivalent to 57·3 of tannin, but the precipitate is somewhat variable in solubility and composition. Another process is to add tannin in excess, and estimate the amount left in solution by running in standard permanganate as long as decolourised. Stelling precipitates by tannin and evaporates, and weighs the "matters, not glue." This is by no means accurate. The proteids can be more exactly precipitated by chlorine (Rideal & Stewart, *Analyst*, September, 1897), or by bromine (Allen & Searle, *ibid.*, October, 1897).

The presence of chondrine reduces the value of gelatine, especially for photographic emulsions. It may be detected by adding a concentrated solution of chrome alum to the glue or gelatine, dissolved in ten parts of boiling water; if any injurious quantity of chondrine be present the liquid will set while hot.

Fat is very objectionable in glue, and for many purposes must be entirely absent. It renders the hot solution turbid, and on standing collects at the top as a greasy film, which may be removed by ether when the jelly cools. A manufacturer's "grease test" is described as follows:—"To a solution of glue add a little lamp-black or Turkish red; thoroughly mix with a brush, and paint it on some pieces of paper; if there is an abundance of grease it will show by little round, white, smooth surfaces on the red or black paint. Specially required for the paper trade and some others."

Physical Tests.—Glue should not become damp in ordinary air, or it is liable to turn mouldy. This fault would indicate impurity or adulteration. The author has met with a few instances of weighting with coarse sugar, molasses, or dextrine, in which this peculiarity was conspicuous.

1. The appearance, hardness, and manner of breaking furnish an idea of value which can be learnt by practice. A splintery fracture shows that the glue is not well boiled. Glue from bones presents a milky appearance, due to a little calcium phosphate. Glue without gloss, very much warped, and of a very dark colour, may be excellent in adhesiveness and tenacity.

2. *Drying and Keeping Qualities.*—About ten cubic centimetres of a 20 per cent. solution are placed on a watch-glass in a cool dry place, protected from dust, and observed for several days in comparison with a standard sample.

3. *Smell.*—Varies very much. Leather glue smells least. Some do not smell when cold, but the hot solution is unpleasant. This property is of importance for some uses.

4. *Behaviour with Cold Water.*—Schattenmann in 1845 proposed the absorption of cold water on soaking. Ten grms. of the sample in small pieces are placed in a weighed beaker, and covered with 200 cc. of water, and kept covered at 60 deg. F. for forty-eight hours. The water is then poured off and the remainder weighed. According to my experience good glues will absorb about five and a-half to six times their weight of cold water, and still exhibit a firm jelly. Some will even absorb eight to ten times their weight and still remain fairly firm. The more consistent and elastic in this state the greater the adhesive power, and the more water it absorbs the more economical in use. Bad glues will often become slimy and fluid in less than forty-eight hours. The water poured off should be free from putrid odour, and contain little in solution. The test is specially applicable to bone glue; that from animal offal does not show the same behaviour.

Kissling soaks 100 grms. of the glue (apparently unbroken), supported on fine wire gauze, in cold water, and weighs at intervals of twenty-four hours, draining fifteen minutes before each weighing. In forty-eight hours he obtains numbers from 221 grms. to 332 grms. of water absorbed, his highest figure being 723 grms. in 216 hours. This method seems inferior to the above. Still less can Cadet's method, absorption in damp air, be recommended.

5. *Lipowitz' Method, 1861: Consistency and Bearing Weight of the Jelly.*—A 10 per cent. hot solution (the jelly from the 10 grms. in the preceding process, No. 4, could be made up to 100 grms. with hot water) is allowed to stand twelve hours at 18 deg. C. in a cylinder of uniform width to gelatinise. A metal rod is soldered to the centre of the interior of a small tin cup, and is supported vertically by passing loosely through holes in two horizontal plates, one of which forms the cover of the cylinder, the other being fixed a little higher. The upper end of the rod carries a funnel, which can be loaded with fine shot. The cup is allowed to rest on the jelly, and the funnel is loaded until it sinks a certain distance into the jelly; the weight of shot then gives the Lipowitz number. The cylinder should be surrounded by a water-jacket to maintain a definite temperature. The result is also affected by the diameter of the cylinder and of the cup. Lipowitz gives the following figures:—

Variety of Glue.	Weight required to force the Saucer down. lbs.
Breslau	3·74
Russian	3·18
Cologne.....	2·67
Muhlhausen I.	1·60
Nördlingen	1·59
Muhlhausen II.....	0·85

The table from which the above figures are taken also contains the following:—1. Water 9 to 21. 2. The percentage of gelatine by tannin is in the same proportion as the water absorbed. 3. The weight supported by the jelly corresponds neither with the absorption nor content of gelatine, nor with the price.

A commercial form of the above, called the "shot-test," is made by cooling the 10 per cent. solution in an ice-box for three or four hours till firmly set. A tube or small beaker is placed on the jelly and loaded with shot till it sinks. By this method I have found that a 10 per cent. jelly will bear a weight, ranging in different glues, from 64 to 12 grammes, and in bad cases falling to 0, the glue being liquid. Kissling ascertains how many seconds are taken by a glass, a zinc, and a brass rod to sink to a zero mark into a jelly. He finds that skin glues have a higher consistency of jelly, less odour, impurity, and volatile acid than bone glue, the water, ash, breaking strain, and absorption of water being about the same in both classes. But, like other observers, he can find no definite or constant relation between these factors and the price.

6. *Weidenbusch, 1859: Breaking Strain of a Rod made of Glue and Plaster of Paris.*—Sticks of plaster cast of uniform size, saturated with glue and dried thoroughly are placed one by one in a metallic ring having notches to receive them, and a lever with the centre of the stick as the resistance, and a mercury cup on the long arm as a weight. Mercury is poured into the cup till the stick commences to break. The weight required is recorded, and com-

pared with a standard glue gives the "Weidenbusch figure." For special purposes where glue is required as a body this would seem to be a practical method, but it is somewhat uncertain.

7. Karmarsch proposed, and the Artillerie Werkstätte, Spandau, has adopted, the severing strain of two blocks glued together. For the important objects of joinery and cabinet-making this would seem to be an eminently natural process, all the rest being more or less arbitrary and artificial, except with reference to covering power and economy. But by a large number of experiments it was found that the error in duplicates was often very large, as has also been remarked by other observers. Hence, I undertook an investigation of the causes of inaccuracy. These were found to consist of: (1) Inconstancy of material and surface in the blocks to be severed. The following figures are given for holding power in kilogrammes per square centimetre :—

Wood.	Cut Across the Grain.	Parallel to the Grain.
Beech	155	79
Hornbeam	126·5	79
Maple	88	63
Oak	128	55
Fir	110	24

The hold on wood cut parallel to the grain being the same whether the fibres are laid parallel or crosswise.

2. Time of heating the glue and temperature of glueing, thickness of glue interposed, pressure used (with occasional obliquity in applying the pressure, therefore inequality in the layer), presence of lumps.

3. Moisture in the atmosphere and temperature while setting, and duration of rest before trial.

4. Temperature, &c., while testing.

5. Possible jerking in applying the weight.

Kissling substituted for wood two vertical solid cylinders of nickel-plated iron, with one end smooth and the other with a hook for applying the strain. But there is a great practical objection to using an absolutely non-porous material for the surfaces to be glued. On examining the fracture it will be found that it usually occurs between the glue and the metal, therefore the measurement is simply that of the adhesion of the glue to the metal; whereas, in practice, if a joint properly made be examined after rupture, it will be found that the parting takes place through the substance of the glue layer itself, about half of which remains attached to each face of the wood, so that the test is a practical measure of the cohesion of the glue. Roughening, lining, or grooving of the metallic surface does not remove this objection.

On the other hand, in severing glued wood it frequently happens that the fracture breaks into the substance of the wood itself, the latter having a lower tenacity than the glue: here the test is obviously valueless.

Bauschinger devised a sliding or lateral test, in which two pieces of red beech wood, a decimètre square, were glued together with their fibres parallel and their surfaces overlapping one centimètre. The pieces were fixed in a Werder's testing-machine and forced in a direction parallel to their surfaces till the glue yielded and the pieces slid over one another. This test is only advisable for special uses, as friction interferes and the wood itself frequently breaks; moreover, in joinery a slide is usually stopped by a mortise.

Horn determined the resistance to a tearing force of the substance itself, as:—Common glue, 9·6 kilos per square centimètre; Cologne, 10·6; gelatine, 31·5.

By a large number of experiments I was led to adopt the following process and precautions:—

For the testing blocks a hard yet moderately porous biscuit stoneware was found to be a much better material than wood. They were made to our design by Messrs. Doulton, and were of the shape of a truncated wedge fitting the claws of the machine—a glue-tester by Bailey of Salford, with a system of levers, and a weight tub loaded with shot which was afterwards weighed. The opposing planes showed a fine uniform grain; they were accurately ground to the square inch. After using they were boiled clean and dried for further use.

One part of broken glue soaked in two parts of cold water for six hours, then raised to 70 deg. C., agitated in a covered vessel till dissolved, and rapidly strained through fine muslin. The plane surfaces were soaked in this for thirty minutes at 70 deg. in a covered vessel, joined carefully with light pressure, the pairs mounted in a frame between uprights, each pair being cautiously loaded with a weight of 5 lbs., and the whole kept for five days in a cool and dry room. At the end of that time they were mounted in the machine and tested, the utmost care being taken to avoid jerking, to put on the weight gradually, and to keep the lever horizontal. An improvement on shot would be a hopper with dry sand or mercury flowing through a regulated orifice with an automatic cut-off at the moment of fracture, which is generally sudden. Supports must be placed just underneath the weight tub.

Example.—A brown Scotch glue of excellent character gave, with four different pairs of stone blocks, a breaking strain of 675 lbs., 636 lbs., 712 lbs., and 645 lbs. per square inch. The average of all the mahogany blocks (ten experiments) was 331 lbs., but the single experiments varied from 70 lbs. to 668 lbs., showing scarcely any regularity or certainty. The stone, on account of its lower porosity, worked best with 50 per cent. glue, the mahogany with 20 per cent.; a thin film of glue remained attached to both stone surfaces after rupture. The greatest advantage that stone blocks possess is their *rigidity*, the largest source of error in wood blocks being due to the elasticity and compressibility of the wood, and consequent yielding and slipping during the test, which often brings about the fracture prematurely, and occasions abnormally low results.

A rough method of glue-testing without apparatus is to cut transversely with a fine saw a stick of wood 5 centimètres (1 inch) square, to glue the cut surfaces together and mount them on end with a moderate weight on top. After three days the bar is laid across the supports, and weighted gradually in the middle till fracture ensues. Good glue should sustain a weight of at least 75 kilogrammes.

8. *Viscosity or "Body" Test.*—An American manufacturer sends me the annexed description of this process as practised by their firm :—

"1 oz. of glue is soaked thoroughly in 10 oz. of water, melted in the water-bath, poured into a 'testing tube' kept at a standard temperature, and the time observed that is taken in running through. 'Water requires 37 seconds, while the very weakest glue takes 40 to 43 seconds.' The ratio is the 'body test'—'indicating the consistency of the glue and the amount of surface it will cover, and, therefore, its cheapness in use and good working and water-taking qualities. We attach more importance to this test than to the consistency of the jelly." The above determination would show a ratio in 10 per cent. solution, taking water as a standard, of $\frac{43}{37}$ for the very weakest glue, or in decimals 1·16.

Julius Fels employs Engler's viscosimeter (improved form, *Journ. Soc. Chem. Industry* 1890, p. 654) with a 15 per cent. solution, and subjoins this table.

No.	Description of Samples.	Per cent. of moisture in original.	Time of efflux of 500 cc. at 30° C. in seconds, water taking 90 seconds.	Viscosity.
1.	Light yellow transparent thick plates.	16·3	149	1·65
2.	Brown transparent glue.	14·0	125	1·36
3.	Sherry-coloured transparent glue	15·4	171	1·91
4.	Light yellow plates, brittle	18·2	150	1·60
5.	Muddy (trüber) glue..	15·2	199	2·21

He remarks that "the viscosities found agree with the respective behaviours under water. No. 2 became entirely slimy in a few hours and fused into one lump, whereas No. 5 kept its shape, and on scraping with the finger showed scarcely any gelatinisation. Nos. 3 and 5 in twelve hours gave a thick jelly, while No. 2 in twenty-four hours yielded only a poor and thin result."

The ordinary preference for a dark glue is justified by the above figures. No. 2 seems to have been over-dried. Lighter glues may have been bleached at the sacrifice of tenacity.

In determinations of viscosity I use and prefer an apparatus modified from Slotte's form, which I have described and figured in the *Journal of the Society of Chemical Industry*, 1891, p. 615, as being simpler, cheaper, more manageable, and giving the datum in terms of absolute measurement. The numbers given by different observers have been obtained at different temperatures and with different strengths, hence are not strictly comparable. Thus, Fels worked at 30 deg. C. with a 15 per cent. solution, the Americans with 10 per cent. "at a standard temperature." Therefore conditions should also be stated. I have been accustomed to use a 1 per cent. solution at 18 deg. C., operating in the way mentioned in the above paper. It is essential to pass the solution first through a capillary tube by pressure to remove lumps, which are more frequent in "muddy" glues—some of the high figures found for this class (*e.g.*, the 2·21 in Fels' table) may be due to this feature. Straining through muslin is not sufficient, but should be used as a preliminary. My figures for different varieties (1 per cent. at 18 deg. C.) have ranged from 1·19 to 1·6.

Kissling has recently given the following table of tests for different glues (*Chem. Zeitung*, xxii. [19], 172) :—

Number.	Description.	Price per cwt. in shillings.	Smell of soaked glue	Consistency of jelly (rod method).	Viscosity of 17 per cent. solution at 25 deg. C.	Non-gelatine percentage (Stelling).
1	Skin glue	44/-	good	over 1,000	15	7·6
2	"	44/-	"	—	9	8·2
3	"	48/-	very good	130	4	8·3
4	Bone glue in powder	36/-	fair	5	4·2	14·8
5	" "	36/-	unpleasant	140	5·5	—
6	" "	36/-	fair	1	3·7	—
7	" "	36/-	"	234	7·4	15·0
8	Mixed glue	41/-	bad	1·5	2·8	13·6
9	Bone glue in cakes	28/-	"	2·4	—	15·4
10	" "	26/-	very bad	—	—	23·2
11	" "	26/-	rather bad	liquid	2·8	15·6
12	" "	26/-	bad	120	4·4	8·75

The author remarks that the fluidity alters considerably on standing. "The smell is especially important, as indicative of the keeping properties. (Compare No. 3 and No. 12 above.) In adhesive power, cheap bone glues give almost as good results as the high-priced skin glues. If a glue buyer requires good smell, gelatinising property, and freedom from acidity, a best skin glue must be selected. If only the adhesive properties are to be considered, a cheap bone glue will answer the purpose."

9. *Foam Test.*—A 10 per cent. solution is beaten or stirred vigorously for three or four seconds with a small glass rod, the height of the foam measured in inches, and the rate of its disappearance noted. "Some glues show ½ in. foam, some ¼ in., ⅛ in., and some none at all. It does not necessarily follow that there is anything wrong with the glue, but a great many customers object to foam." For some purposes frothing is a great disadvantage.

Valuation of Raw Materials.

The value of glue-making materials, more especially of tanners' "spetches" (refuse and parings) depends not only on the absolute amount of glue-forming substance, but also on its relation to the non-gelatine. Gantter boils 100 grammes of the sample with 1 litre of water and a few drops of soda till completely extracted, makes up to 2 litres and allows to stand covered in a warm place for ten hours. The insoluble matters settle, while the fat rises to the surface. The residue and ash are determined in 20 c.c. (= 1 gramme of substance). Another 20 c.c. are diluted, neutralised with acetic acid, precipitated by tannin, filtered, and any excess of tannin withdrawn by hide-powder; the liquid evaporated, dried, and its ash deducted, gives the organic non-glue-making material.

It may be said in conclusion that a careful

inspection of the results of the scientific examinations of a glue or of raw materials gives frequently a better criterion of its value for a definite purpose than the price, as the latter is often determined by hand tests and by artificial considerations.

ARCHITECTURAL SOCIETIES.

Edinburgh Architectural Association.—A meeting of this Association was held on the 5th inst. in the Royal Institution, Princes-street, Mr. Thomas Ross, President, in the chair. After the minutes had been read, Mr. James Bruce, W.S., referred to the honour recently conferred upon Mr. M'Gibbon, an ex-President of the Association, by the University of St. Andrews, and moved that they express the sense of their high satisfaction that St. Andrew's University had seen fit to confer the degree of LL.D. on Mr. M'Gibbon. The motion, which was seconded by Mr. Kerr, architect, was cordially agreed to. Mr. Campbell Irons then read a paper on the "Architectural Antiquities of Leith." In the course of his lecture, which was illustrated with limelight views, Mr. Irons said one of the difficulties he had had to contend with was the paucity of architectural features in Leith. The origin of Leith was wrapped in mystery. The first reliable mention of the port was in the foundation charter of the Abbey of Holyrood House, granted by David I. in 1128, in which it was stated that the first house built in Leith was erected in the twelfth century. The lecturer proceeded to give descriptions of such old buildings as Leith possessed, or still possesses, and related various anecdotes referring to the owners and occupiers of these. By means of the lantern a large number of illustrations of the antiquities of the port were shown.

Dundee Institute of Architecture.—Mr. T. Delgaty Dunn delivered a lecture to the Students' Section of the Dundee Institute of Architecture in the Technical Institute on the 1st inst. Mr. Kennedy presided. The lecturer at the outset referred to the difficulty of defining exactly what was meant by ornament in architecture. After examining some of the more common theories, he said for the purposes of his lecture he desired to include in the definition, in addition to the panels, foliage or isolated ornaments, the varying and often subtle means whereby the architect gives an elegant, strong, or reposeful character to his edifices. In illustration of this a comparison was made between the typical buildings of the Egyptians and Greeks. It was shown by lantern illustrations how the shape of the walls, towers, and columns of the Egyptians suggested weight and mass, and how the ornament confirmed and intensified the suggestion. In contrast to this it was pointed out how the Greek ideal entirely differed in its architectural expression; how every detail suggested the carrying power with ease and grace. The value of capitals, &c., as stop or pause points in architecture was next referred to. The importance of a thorough study of the architectural effect of mouldings was considered at length, and the lecturer dwelt on the absurdity of using a delicate set of Greek mouldings, originally designed for white marble, to be seen in a pure atmosphere, under a sunny sky, copied in dull grey sandstone exposed to a smoke-laden atmosphere under different climatic conditions. To expect such mouldings to be classic in feeling and effect indicated either a complete disregard of first principles or an equally complete ignorance of them. In this connexion it was shown how the Romans adapted classic forms to the different conditions of their employment. An interesting part of the lecture was an analysis of the theory of light and shade, and the different effects produced by different stone dressing. It was shown that rough stone expressed stability better than smooth, because the nature of its crystalisation was betrayed; while in stone which had been carefully tooled or rubbed down the natural grain was obliterated, and an artificial one substituted, resembling the grain of some other material, not stone, which was known to resist pressure indifferently. The effects of polishing, as in granite, were explained, and the manner in which artificial texture could be given to stone by different ornamental treatment, and the necessity for the ornament to keep step with the mechanical function of the various parts of a building. Following up this principle, the lecturer showed how carved ornament on structural parts could be made to accentuate the function requirements of the structure. Regret was expressed that the object of using carved ornament for other than the purely æsthetic one was not better understood by public boards as well as private clients, who would thus appreciate the reason why architects would introduce carving. It was only fair to say, however, that architects did not always put the ornament in the places where its peculiar functions would be best and most economically illustrated. Consideration was then given to ornament in its narrower sense, as well as to the laws governing density, texture, and colour, where the latter as a means of architectural expression was employed. The artistic function of the spire, as apart from its use as a belfry, as well as other features of Gothic architecture, were entered into at some length, and explained by the aid of slides. In conclusion, Mr. Dunn urged the expenditure of care in the choice of appropriate ornament, and the study of fitness and function in architecture. The adoption of a caprice was not to be justified by antiquity, nor was the hackneyed repetition of old and ill-understood forms the more commendable for the same reason. While the Corinthian capital might have been a very admirable one, there was no reason why it should be the stock piece of architects to all eternity. A thorough knowledge of the principles on which ornament was formed was necessary to all architects, not only to prevent the common error of introducing it without a reason, but to ensure its suitability where it was desirable to use it. The very permanence of architectural forms was the strongest argument in favour of the best being done.—The designs in the students' competition were submitted to the Council of the Perth Architectural Society for decision as to order of merit. Messrs. Young, Buttar, Menart, and Stewart have issued their award, and the drawings are now on exhibition in Gallery No. 4, Albert Institute. In Section I., for assistants, there were two competitors for a design of a Presbyterian church, and the first place is awarded to Mr. John M. Mathers (under motto "Norwood"), assistant to Mr. T. Martin Cappon; the second being Mr. D. B. Campbell, Blairgowrie. In Section II., for pupils over two and a half years' pupilage, there were seven entries for a design for a gate lodge to a public park or mansion, the first place being awarded to Mr. D. S. Cullen, pupil with Mr. Cappon (his motto being "Pantile"); the second place to Mr. Archibald Soutar, Arbroath (motto "S."); third ("Koh-i-Nor"), Mr. David Harvey, St. Andrews, this last being specially commended for showing the constructive lines. In Section III., for pupils under two and a half years' pupilage, there were four competitors for a design of a traceried window, Mr. John C. Soutar (motto "Spider"), pupil with Mr. Cappon, being placed first, and Mr. Allan Robertson, jun. ("Never Venture Never Win"), second, the drawings by the former being distinguished for draughtsmanship and construction. The assessors comment favourably on the thoughtful study shown by the competitors, and on the draughtsmanship displayed, especially in the junior section.

Glasgow and West of Scotland Technical College: Architectural Craftsman Society.—The usual meeting of this Society was held at the Rooms on the 7th inst., Mr. R. W. Horn, A.R.I.B.A., occupying the chair. A paper was read by Mr. Jas. Lochhead, A.R.I.B.A., on "Shop-Fronts, Past and Present." He showed what an important branch of architecture shopbuilding is—how essentially modern; and illustrated by limelight views the evolution of the shop-front, from the fifteenth century up till the present day, from the old-fashioned "rows and bulk shops" to the modern plate glass and colonnaded recessed fronts. He expressed the opinion that 8 ft. above the pavement was sufficient for the display of goods in the average shop windows, and pointed out how the space above lent itself to architectural treatment. The average shop-front was also criticised and improvement suggested. A very good selection of views of shop-fronts, particularly local ones, was shown.

Tramp Wards, &c., Birmingham Workhouse.—Alterations and additions, including the erection of extra tramp wards, the extension of the old dining room, and the erecting of new stores, are in progress at the workhouse in Western-road. The architect is Mr. W. Ward, and the contractors are Mr. J. Atkinson for the tramp-wards and Messrs. Smith & Pitt for the extensions to the dining-room and the erection of stores.

ARCHÆOLOGICAL SOCIETIES.

Archæological Institute. — A general meeting of this Institute was held on the 5th inst., Mr. Emanuel Green, F.S.A., Hon. Director, in the chair. The Worshipful Chancellor Ferguson, F.S.A., exhibited a Persian talisman, made of a circular disc of thin brass 3¾ in. in diameter. The centre is occupied by a circle ⅝ in. in diameter containing a rude human face representing the sun. Ranged round the central sun are twelve cartouches each containing Persian inscriptions signifying various attributes of God. Outside these circles are twelve other circles containing the signs of the Zodiac. Every one of the twelve signs was supposed to have an influence over certain parts of the human body as shown by Chaucer in his "Treatise on the Astrolabe." In it is a diagram which shows the influence of the Zodiacal signs upon the human body. Thus Aries takes the head, and the order of the Zodiacal signs is gone regularly through, descending the human body and ending with Aquarius for the legs below the knee and Pisces for the feet. Hence the talisman seems to have been used by the poorer classes to avert disease, probably, as suggested by Chancellor Ferguson, by consulting the talisman and addressing a prayer to God by the name opposite the sign which has influence over the part of the human body affected.—A paper was read by Mr. J. Lewis André, F.S.A., on the "Ritualistic Ecclesiology of North-east Somerset." He commenced by contrasting Norfolk and Somerset ritualistic ecclesiology, and proceeded to discuss the various fittings of North-east Somerset churches; namely, altar stones and altar accessories, with allusions to the numerous sancte bellcotes, several of which retain the bell itself. Only one Easter Sepulchre and one low side window seemed to exist. Mr. André noticed the stalls and the numerous square bowled fonts of Romanesque design, especial attention being directed to the very curious example at Locking. He further referred to the prominence given to the rood turrets, the peculiar porch galleries, as well as to the interesting stained glass windows.—Mr. J. P. Harrison, M.A., read a paper on the "Influence of Eastern Art on Western Architecture in the Eleventh Century." So little is known of the state of architecture in France and England in the first half of the eleventh century that it seemed well to give some of the information bearing on the subject which has lately been gathered from the works of Baron de Caumont and M. Viollet-le-Duc. The chief information from these authorities is the influence exerted in the centre of France by a colony of Greek merchants, who established an emporium at Limoges, whence Eastern art and architectural ornament were diffused along trade routes in different directions early in the eleventh century, besides the introduction by them of cupolas and vaulting in Aquitaine. A second important improvement in architecture, in this case in Normandy, at Rouen and Bernay, in the time of Duke Richard II., appears to be due to visits from Syrian and Armenian bishops and monks at about the same date. Symeon, the Abbot of St. Catherine's on Mount Sinai, in particular, spent two years at Rouen and built a church there for a Norman nobleman. M. Ruprich-Robert describes the architecture at Bernay as entirely different from the Norman work at Caen, and evidently by a foreign artist. The date of the church is pronounced by M. Robert to be before 1050. Another point of considerable importance on which he throws light is the introduction of a feature, derived from Syrian art, into Western Romanesque. It is the change of a Latin plan of church for an eastern arrangement of pillars, two and two, of different sizes, at St. Etienne at Caen, by Lanfranc, in 1064, with a view of introducing vaulting. Mr. Harrison mentioned that alternate pillars and wall-shafts, like those at Caen, exist in Harold's church at Waltham, believed to have been built at nearly the same time; and that the chevron ornament on nave arches was not a Norman invention.

British Archæological Association.—The ninth meeting of the session of this Association was held on the 5th inst., when two papers were contributed, one by Dr. Alfred C. Fryer, M.A., on "Ancient Fonts in Gower." The peninsula of Gower is situated at the south-western end of Glamorganshire, and stretches out into the sea for a distance of about twenty miles, being separated from the mainland on the north by the Lougher River, and terminating

in the promontory known as Worms Head. The name is thought by some to have been derived from "Gwyr," meaning luxuriant; but this word hardly describes the locality correctly, as at the time the name was given the district would be a dense forest and swampy marsh. The old British word "Go-hir," far, long, outstretching, would denote that this peninsula is a narrow neck of land. It has been thought, however, that the true derivation may be found in the word "Gŵyr," meaning slanting or oblique. The ancient fonts in Gower are some fourteen in number, and are found at Bishopston, Cheriton, Ilston, Llandewi, Llangewydd, Llanmadoc, Nicholaston, Oxwich, Oystermouth, Pennard, Penrice, Porteynen, Reynoldston, and Rhossily. Like the churches, they possess a strong family likeness—nine of them are square or oblong, three cylindrical, and four octagonal. The dates of the Gower fonts are most likely of the same period as the churches, that is about the time of the Norman occupation. The fonts are mostly very plain, but that at Pennard is somewhat more adorned, having an arcade, and that at Oystermouth is scalloped at the base of the square bowl. They were well illustrated by a series of clear photographs specially taken. The second paper was by Mr. H. Syer Cuming, V.P., F.S.A.Scot., on "Pin Lore and the Waxen Image."

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The usual monthly meeting of this Society was held in their library at the museum, Queen-street, on the 10th inst., the Hon. Hew Dalrymple, Vice-President, in the chair. In the first paper Dr. Robert Munro, Secretary, gave an account of a crannog recently discovered at Hyndford, near Lanark, and excavated by Mr. Andrew Smith, F.S.A., Scot., Broompark, Lanark. In the second paper Mr. Thomas Ross, architect, described a series of six paintings of "The Sibyls," found on a wooden partition in taking down the old house of Wester Livilands, near Stirling, the property of Mr. J. M. Drummond. The partition containing the paintings was divided into six compartments by Corinthian pilasters, having frieze and cornice, with the portraits of the sibyls above, in panels about 3 ft. square. The style of the paintings and of the decorations around them is quite in agreement with what is to be found in many old houses in various parts of Scotland erected about the beginning of the seventeenth century, to which period the present examples may be most probably assigned. Beneath each portrait there is a six-line verse inscribed in black-letter, similar to those at Cheyney Court in Herefordshire, which are apparently about the same date. These verses give the names and the nature of the prophecies ascribed to the different sibyls in the scheme of Christian symbolism, of which they form a part. In the third paper Bishop Dowden gave some notes on the inventory of Church plate, vestments, copes, relics, and service-books belonging to the Cathedral of Glasgow in 1432. In the last paper Mr. F. R. Coles, assistant keeper of the museum, described a small prehistoric cemetery at Juniper Green, containing cist and incinerated burials, from which a large cinerary urn and two smaller urns of food-vessel type had been presented to the museum by Messrs. Cowie & Son, builders.—*Glasgow Herald.*

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of this Institution, on the 11th inst., Mr. W. H. Preece, C.B., F.R.S., President, in the chair, it was announced that eight Associate Members had been transferred to the class of Members, and that forty-one candidates had been admitted as Students. The monthly ballot resulted in the election of one Member and of forty Associate Members. The seventh "James Forrest" Lecture, by Professor J. A. Ewing, will be held on Thursday, the subject being "Magnetism." The lecture will be repeated on Friday, April 21, at 4 p.m., for the benefit of members and their friends.

SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers, held at the Royal United Service Institution, Whitehall, on the 10th inst., Mr. J. C. Fell, President, in the chair, a paper was read on "Machine Tools," by Mr. E. C. Amos, M.I.Mech.E. In his opening remarks, the author pointed out the importance of engineers being well acquainted with the most modern practice in regard to the construction of machine tools. He further added that, owing to the important part now played by machinery in the world, the progress of this country in relation to others would be largely determined by its capacity to turn out the best and most improved tools. The author then referred to the distinctive features of modern tools, directing particular attention to the fact that it had now become the practice to substitute for one machine doing a great variety of work a number of machines, each dealing with one class of article. Modern practice also called for greater accuracy and more automatic machinery. He observed that ball thrust, hollow spindles, cut toothed gear, and other refinements had now become very general, and resulted in the production of better work at less cost. He then divided his subject into a series of headings, which included, amongst others, lathes, drilling, boring, milling, planing, shaping, slotting, keyway-cutting, punching and shearing, plate bending, metal sawing and forging, and welding machines. Under the lathe section, descriptions were given of some powerful machines by Sir William Armstrong, Whitworth, & Co., Limited, including a 20-ft. faceplate break lathe, weighing 178 tons, also a special lathe for boring out and chambering guns. The author also devoted considerable space to a description of various forms of capstan lathes with wire feeds and chasing apparatus, pointing out what an important tool this had become. Of drilling machines several useful types were described and illustrated, including a semi-radial drill of American design, which is of entirely novel construction. The author's reference to milling machines indicated the importance he attaches to this class of tool, which is now in so much demand in all well-appointed shops, and is made in such a variety of shapes. A number of other tools under the headings enumerated were also described, and in most cases illustrated. The author then described several hydraulic power machines, and under another heading gave a description of a class of tool now coming very much to the front, viz., the pneumatic. Some useful information was given as to their advantages and economy. Some figures and data given in this connexion showed that, in drilling, four times as much could be done as compared with hand drilling, and that they effected a saving of some 50*l.* to 75*l.* per annum per tool, even in a comparatively small drill.

Illustrations.

HOUSE No. 37, HARLEY-STREET.

THIS house is situated at the corner of Queen Anne-street and Harley-street, and has recently been rebuilt. The elevations are of Monk's Park stone and the roofs are covered with Welsh green slates. Messrs. Matthews Bros. were the builders.

Mr. F. E. Schenck, the sculptor, has supplied the interesting series of panels in low relief relating to the arts and labours of life, together with the winged figure surmounting the angle oriel. The plan provides a small central hall on the ground floor, a suite of drawing rooms on the first floor, and the larger bedrooms, with small dressing-rooms attached, on the second floor. The large windows on the third floor were designed for the nurseries. A billiard room is provided in the roof story.

Mr. Beresford Pite is the architect.

PALACE OF VARIETIES, HASTINGS.

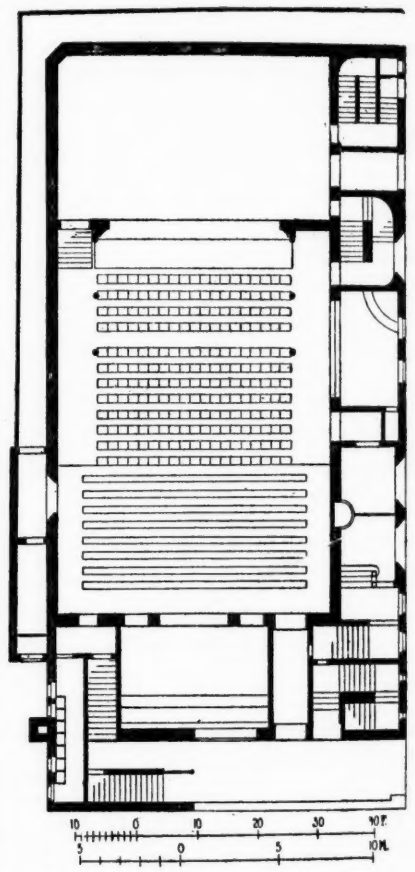
THIS building, which stands on the sea front at Hastings, is just completed from the designs of Mr. Ernest Runtz.

The building has a frontage of 131 ft. in length. The main approach is from the Marine Parade, through an entrance hall which leads directly into the stalls, and whence the circle is reached by a fire-proof staircase. The pit entrance is approached from the Marine Parade by a right of way on the west side of the theatre, and the gallery entrance is at the end of this right of way. The pit has an emergency exit leading directly into an open passage way on the north side of the building. There are saloons both for pit and stalls, and lavatory accommodation for both sexes has been provided for. The accommodation in the stalls is for seating 228 persons, and in the pit 176 persons, and the gangways for both parts are in accordance with modern regulations.

Besides the access staircase to the grand circle, there is at the south-west corner of the building another fireproof staircase for use in case of emergency, leading directly into the before-mentioned right of way. In connexion with this circle there is a foyer overlooking the sea, provided with four windows, leading on to a balcony. This is not only an advantage for ventilation of the building in hot weather, but is also a means of safety in case of fire. In the rear of the circle a saloon is provided for the accommodation of visitors, raised 4 ft. 6 in. above the back gangway of the circle, so that the stage can be seen from it. Accommodation is provided in this part of the house for 201 persons. The main approach to the second tier has a firerproof exit directly on to the Marine Parade. It is connected with an open loggia over the foyer, for use in the summer months. Accommodation is provided for 395 persons.

The building is lighted by electric light, supplemented by gas. The heating is on the low pressure system by means of radiators, and immediately in the rear, over the gallery, the roof is to be made moveable, to assist in the ventilation of the building. The hall is constructed of local bricks faced with terra-cotta. The respective tiers are constructed of iron and concrete, and the roof principally of iron.

In the internal decoration a scheme has been adopted of terra-cotta red and old gold for the



Palace of Varieties, Hastings. Plan.

(From Mr. E. O. Sachs's "Modern Opera Houses and Theatres.")

walls and box and circle fronts, the draperies and upholstery being in amber satin and velvet; the carpeting of neutral green. Over the proscenium is a frieze painted by Mr. Buchel, representing Venus rising from the sea; and over the boxes are semi-circular decorative panels representing the four Seasons.

The general contractor is Mr. Peter Jenkins, of Hastings. The following is a list of other firms employed on the building:—Messrs. Doulton & Co. (Parian, faience, and terra-cotta); Messrs. Dennett & Ingle (constructional steelwork); Messrs. George Jackson & Sons (plastic decorations); Messrs. Wolfe & Hollander (upholstery and furnishing); the Brush Electrical Company (electric light, general contract); Messrs. Bruce & Co. (electric light wiring); Messrs. Carter & Aynsley (electric light fittings); Messrs. Rosser & Russell (heating apparatus); Messrs. Merryweather & Co. (fireproof curtain); Mr. J. N. Lyons (stage laying and fixing); Mr. Edward Bell (decorations); Mr. Charles Buchel (decorative panels); Mr. W. T. Hemsley (scenery); Messrs. Strode & Co. (sunburner); the Falkirk

Iron Company (ornamental ironwork); the St. Pancras Iron Company (ornamental awnings); Messrs. G. Vigor & Co. (saloon fittings); the Elliott Patent Stone Company (fireproof staircases).

The aspect of the main front of the building is very unusual and picturesque; and during its progress, as we had occasion to notice on a visit to Hastings, it attracted a degree of attention and interest which the public do not often bestow on buildings in progress.

SEDILIA, STALLS, &c., ST. BRELADE'S CHURCH, JERSEY.

THIS church is one of the oldest in the island, and the sketch shows a great change from the arrangement which existed a short time ago, when the chancel was full of pews facing and sloping towards the pulpit.

The sedilia and stalls are to be of oak, the basement or the chancel is to be in three different coloured granites, there being several beautiful varieties of this stone found in the island, and the idea is to suggest waves rolling up towards the altar as the central feature of the church.

The plaster has been removed from the walls, and the warm brown granite, with which they are built, cleaned off and pointed. Some signs of whitewash have been found on the stone under the plaster.

Messrs. Rogers, Bone, & Coles are the architects. The drawing was exhibited at last year's Royal Academy.

TOWER: ST. MICHAEL'S, WOOLWICH.

THE chancel of this church was erected about eighteen years ago, from the designs of Mr. Walters, who is now practising in America. It is a brick groined structure. The nave is from the design of Mr. Butterfield, and is a striking example of his methods—broad and simple in treatment and marked by two lofty western porches, with side walls extending to the full height of the clearstory, and thus forming western transepts. The tower, which will be at the junction of Mr. Walters' and Mr. Butterfield's work, has been designed to respect both and have at the same time a character of its own. The completion of the church has been stayed by the sudden and untimely death of the vicar, the Rev. Hugh R. Baker, to whose energy the carrying out of the work, so far, has been due. It has been suggested that the tower, which he was most eager to see finished, would form a fitting memorial to his work in the parish.

W. D. CAROË.

OLD RENAISSANCE INTERIORS, NUREMBERG.

THESE drawings represent some characteristic interiors in some of the old houses of the late Renaissance date in Nuremberg, and are from drawings by Herr Theodor Eyrich, architect, of Nuremberg, to whom we have been indebted before for some interesting illustrative contributions.

They comprise interiors from three houses known respectively as the Peller, Fembla, and Heerdegen houses; plans of one floor of each are given. Herr Eyrich observes that in the old Nuremberg houses the second floor was the floor of honour for the reception of guests. In the plans the characteristic arrangement of the staircases will be noticed. In the view in the Peller house the extraordinary piece of *rococo* shown is the fire-place or stove-place decoration.

In the hall of the Heerdegen house an interesting feature is the glazed recess (*speiseschrank*) for the side-board and crockery.

The small ground plan of the Topler house is given as an example of the manner of fitting in the staircase into an irregular plan.

COMPETITIONS.

FIRE BRIGADE STATION, BRADFORD.—The first premiated design in the competition for a Central Fire Brigade Station at Bradford is by Messrs. Mawson & Hudson, Exchange Buildings, Bradford; the second, by Mr. W. J. Morley, Swan Arcade, Bradford; and the third by Mr. Owen Roberts, Liverpool.

TECHNICAL COLLEGE, WIGAN.—The plans submitted by Messrs. Briggs & Wolstenholme, of Blackburn and Liverpool, have been selected in this competition. The complete scheme will cost about 30,000*l.* The plans provide for a lecture hall to accommodate 700 persons. The structure will be of pressed bricks and terra-cotta, and the principal entrance will be in Library-street.

SCHOOL, KILBURN.—In the competition for designs for a public elementary school at Salusbury-road, Kilburn, the following architects have been selected to compete:—Mr. E. H. Lingen Barker, Chancery-lane, W.C.; Mr. Charles Bell, Salters' Hall-court, Cannon-street, E.C.; Mr. G. E. T. Lawrence, Queen Victoria-street, E.C., and Mr. Geo. W. Webb, Reading.

HARBOUR, PORTESSIE, BANFFSHIRE.—The plans submitted by Mr. Melville, civil engineer, of Aberdeen, have been selected in this competition. The east pier will extend 369 ft. and the north-west and west pier 730 ft.

COUNTY BUILDINGS, EDINBURGH.—Following up their resolution arrived at some time ago to reconstruct the Edinburgh County Buildings, the Mid-Lothian County Council have now invited architects to submit competitive designs for the new buildings. In their printed conditions of competition the Council offer two premiums—the first of 100*l.* and the second of 50*l.*; and it is declared that if from any cause the buildings are not proceeded with, and no drawings other than the competitive drawings have been prepared, the selected architect shall receive a payment of 200*l.* in full of all claims. It is likewise stated that any design which is estimated to cost more than 40,000*l.* may be disqualified. The available site specified embraces Liberton's Wynd—that is to say, the buildings may be brought forward towards the existing pavement on the east side of Melbourne-place; on the north or High-street side, and, again, on the east or Parliament-square side, the new structure may be brought out as far as the railings which enclose the present building; at the south-east corner the buildings may come out to the lane that skirts the Signet Library at that point; whilst towards the south they may run down as far as the line which divides the County Council site from the low-lying open ground belonging to the Advocates' Library. In regard to the Ionic portico, which is so conspicuous a feature of the Parliament Square elevation of the present building, competing architects are expressly asked to consider whether it is desirable to retain it in its present position, or in any other position in connexion with the new building; and while the Council are entitled to build up to the limits of their ground, competitors who consider it desirable to remove the portico are requested to have regard to the general amenity of Parliament Square in the building line which they may adopt for the east front of the new building. In the statement of accommodation required, mention is made of a Council chamber for forty-one members, two committee rooms, and a County Councillors' writing-room; offices for the different county officials and their assistants, and for the headquarters staff of the county police; a public office for the collection of rates; and a Justice of Peace Court-room, with a floor area of 1,250 square ft. approximately. The designs are to be lodged with the County Clerk by June 27.

HOUSES TO WITHSTAND THE SUBSIDENCES IN THE SALT DISTRICTS.—The Northwich Salt Compensation Board have just completed the adjudication in this competition. They offered premiums of 20*l.*, 10*l.*, and 5*l.* respectively for plans and specifications of buildings best adapted to withstand destruction by subsidence. Thirty designs were received, but none were sufficiently original to merit the first award. The second premium of 10*l.* has been awarded to Mr. J. Cawley, architect, Northwich, and the third to Mr. C. Pickford, London.

THE BUILDING TRADE DISPUTE.

As we briefly stated in our last issue, the conference held on Thursday last week between the employers and representatives of the Plasterers' Union broke up without a satisfactory issue. The conference was held in the large room of the offices of the National Association of Master Builders, Bedford-street, between twelve master builders and plasterers, and twelve members of the National Association of Operative Plasterers. The conference was presided over by Mr. Alderman Holdsworth, of Bradford, and lasted from half-past two until five o'clock.

The conference was appointed in consequence of an agreement arrived at in two letters, the one from the masters to the operatives, dated March 18, containing the following clause:—"Will you be good enough to inform them (the masters) definitely whether your Association intends to persist in coercing any men into your Union, and, if so, what men?" To this the Secretary of the Operative Plasterers, in the course of his reply, said:—"In reply to yours of the 18th inst., I have to inform you that we have not any desire, neither have we ever had any desire, to coerce any one into our Association; and we claim the right and privilege to persuade any plasterer working at the trade to become a member."

At the opening of the proceedings, Mr. Deller took the leading part as spokesman for the operatives, and there was a general discussion with reference to the various points set forth in the Employers' Manifesto. As no progress was made, the masters withdrew, and submitted the following four questions in writing to the men, asking for their written answers thereto. These questions and replies were as follow:—

1. "Are you properly authorised to definitely agree to and sign any agreement we may arrive at with reference to the Employers' Circular of February 1?—Yes."

2. "It must be understood that any agreement shall be applicable to the whole of the country?—Agreed."

3. "Are you prepared to enter into a monetary guarantee on both sides for the faithful observance of any agreement arrived at?—We cannot agree to a monetary guarantee."

4. "In your letter of March 24 you state that you have no desire to coerce any one into your Association, and claim the right to persuade only. Do you confirm or withdraw that statement?—We wish to be honest with you, therefore withdraw the word persuade only, as we could not guarantee that our members would agree to such action on our part."

These answers brought the conference to an end, and the chairman announced that, as the assurance previously given by the men on the question of coercion was withdrawn, the employers declined to continue the conference further.

Since the conference the locked-out members of the Plasterers' Union have made renewed preparations for the continuance of the dispute. Special lock-out pay was sent out on Saturday to all the branches of the Union whose members are affected. The locked-out workmen now number about 1,500, and the officials of the Union state that this number is scarcely greater than the ordinary number of unemployed in bad seasons of trade. The membership of the National Association of Operative Plasterers is about 13,800, of which number 3,500 are employed in the London area. It is estimated that the levy of 3s. per week on each of the union members still in work will provide amply for the demands now made by the locked out members of the union's funds. The members of the Amalgamated Society of Engineers have decided by ballot to raise a levy of 2d. per week per member on behalf of the plasterers as long as the lock-out lasts. The general impression among the members of the Plasterers' Union on Saturday last was, it is stated, favourable to the action of the Executive Council in declining to accept the terms of the Masters' Association. The men state that if the proposals of the masters had been accepted their position would have been made worse than it was before the ten weeks' strike of 1896, and the "rights" that they won by that fight would be lost.

Mr. M. Deller, the general secretary of the Plasterers' Union, informed a Press representative that they adhered to the statement made in the letter of March 24, to the effect that the union "claimed the right and privilege to persuade any plasterer working at the trade to become a member. All they objected to was the addition of the word 'only' after persuade. They were prepared to accept the word 'persuade,' but would not pledge themselves to accept the phrase 'persuade only.'"

It is stated that the plasterers locked out in Leeds have all found work. The co-operative society started on behalf of the men has engaged the whole of the hands who had not left the district for jobs offered elsewhere.

SCHOOL BUILDINGS, WAVERTREE, LIVERPOOL.—The additional buildings in connexion with St. Mary's Schools, Rathbone-road, Wavertree, were opened on the 10th inst. The new buildings, which have cost about 1,000*l.*, will provide seats for 200 more children. Mr. H. L. Beckwith was the architect, and Messrs. Morrison, of Wavertree, were the contractors.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

AT the meeting of the Building Act Committee of the London County Council held on March 27, being the day before the Council adjourned for the Easter recess, the proceedings were governed by the clause in the order of reference which empowers the Committee at certain seasons to act on behalf of the Council in relation to matters included in the order of reference. The following applications under the London Building Act, 1894, were considered. Those applications to which consent has been given are granted on certain conditions.*

Lines of Frontage.

Battersea.—One story shops upon part of the forecourts of Nos. 98 and 100, Lavender Hill, Battersea (Mr. T. J. Evans for Mr. T. Jones).—Consent.

Clapham.—That the application of Mr. J. F. Evitt for an extension of the period within which the erection of a mission room with a projecting porch on the north side of Grange-road, Clapham, on a site at the rear of Nos. 24 and 26, Lambourn-road, was required to be commenced, and also for consent to the omission of the basement story, be granted, upon condition that the building referred to be commenced within twelve months from April 4, 1898.—Agreed.

Greenwich.—A one-story addition to No. 14, Vanbrugh Park, Blackheath, to abut upon Vanbrugh Park-road (Mr. W. E. Holding).—Consent.

Hampstead.—That the application of Mr. W. Wallace for an extension of the periods within which the erection of a one-story hall or parish-room on the north side of Frognal-lane, Hampstead, near its junction with Finchley-road, was required to be commenced and completed, be granted, upon condition that the building referred to be commenced within one year and completed within two years from July 5, 1898.—Agreed.

Hampstead.—Porches to four buildings on the east side and six buildings on the west side of Cannon Hill-road, Hampstead (Messrs. Boehmer & Gibbs for Mr. E. J. Cave).—Consent.

Lewisham.—Buildings on the east side of Rushey Green and the north side of Sangley-road, Lewisham (Mr. J. Norton for Mr. E. MacF. Patterson).—Consent.

Marylebone, West.—A covered staircase, forming an approach to a coal-yard, on the south-west side of Grove-road, St. Marylebone (Mr. E. Wragge for the Great Central Railway Company, Limited).—Consent.

Norwood.—Buildings on the western side of Herne Hill, Lambeth, between No. 36 and Rollscourt-avenue (Mr. H. A. Brown, jun.)—Consent.

St. George, Hanover-square.—Two iron and glass shelters at the Walsingham House Hotel, Piccadilly (Mr. H. S. Clutton for Lord Walsingham).—Consent.

Brixton.—One-story shops in front of Nos. 3A, 5, 7, 9, 11, and 11A, Bedford-road, Clapham (Mr. J. J. Freeland for Mr. W. E. Brooks).—Refused.

Clapham.—A coach-house, loose-box, and covered yard in front of the present stabling belonging to a house known as "Elmhurst," Cavendish-road, Clapham Common, to abut upon Trouville-road (Mr. J. F. Palser for Mr. G. B. Cooper).—Refused.

Dulwich.—A one-story shop upon part of the forecourt of No. 99, Anerley-road, Anerley (Mr. S. C. Dunk).—Refused.

Greenwich.—A one-story addition at the rear of the "Woodman" public-house, Hill-street, Old Charlton, to abut upon Maryon-road (Mr. A. Thompson).—Refused.

St. George, Hanover-square.—An iron and glass shelter in front of No. 152, Victoria-street, St. George, Hanover-square (Mr. R. Willey for Mr. G. Odone).—Refused.

St. Pancras, East.—A Fire Brigade station on the site of No. 174, Euston-road, and No. 69, Euston-square, St. Pancras (Mr. R. Pearsall for the Fire Brigade Committee of the Council).—Refused.

Width of Way.

Bermondsey.—Retention of a four-story building erected on the site of No. 58, Tanner-street, Bermondsey, in the position shown upon the plan submitted with the application of Mr. J. Gale for Messrs. Dunn Brothers.—Consent.

Finsbury, Central.—An inclosed porch on the east side of the Wesleyan Methodist Chapel, St. John's-square, Clerkenwell, at less than the prescribed distance from the centre of St. John's-passage (Mr. A. Wakerley for the Rev. J. E. Wakerley).—Consent.

Islington, East.—That the application of Mr. R. Midworth for an extension of the period within which the erection of six two-story bulidings on the south side of Road's-place, Hornsey-road, Islington, partly on the site of Nos. 4 and 5, was required to be commenced, be granted, upon condition that the buildings referred to be commenced within nine months from October 4, 1898.—Agreed.

Hackney, North.—A one-story addition at the rear of No. 1, Clissold Park-villas, Stoke Newington, at less than the prescribed distance from the centre of the roadway of Park-lane (Mr. F. Parsons for Mr. I. Jones).—Consent.

Space at Rear.

Marylebone, West.—The extension, above the diagonal line mentioned in Section 41 of the London Building Act, 1894, of a portion of a building, viz., the "Globe" public-house, which is proposed to be rebuilt on the site of Nos. 43, 45, and 47, Marylebone-road, and No. 21, York-place, with an open space at the rear of the new building (Mr. W. H. Scrymgour for Mr. A. C. Stock).—Refused.

Deviation from Certified Plan.

Chelsea.—Certain deviations from the plan certified by the Disrtict Surveyor under Section 43 of the London Building Act, 1894, so far as relates to the proposed rebuilding of the "King's Arms" public-house, No. 51, Sloane-square, Chelsea, at the corner of a roadway leading into Eaton-square (Mr. J. K. Cole and Mr. K. Wood for Mr. J. King).—Refused.

Lines of Fronts and Width of Way.

Kennington.—A one-story shop upon part of the forecourt of No. 98, St. Mark's-road, Kennington, at the corner of Farmer's-road (Mr. A. E. Mullins for Mr. T. A Jones).—Refused.

Brixton.—One-story shops in front of Nos. 1 and 3, Bedford-road, Clapham (Mr. J. J. Freeland for Mr. A. Wilson).—Refused.

Lewisham.—A one-story water-closet addition to No. 22, Lee-terrace, Lee, to abut upon Dacre Park, (Mr. R. T. Blackaller for Mr. H. M. Gordon).—Refused.

Wandsworth.—Two one-story shops on the south side of Greyhound-lane, Streatham, adjoining No. 102 (Mr. J. Johnson for Mr. J. Piggott).—Refused.

Lines of Frontage and Construction of Gangway.

Rotherhithe.—Four iron gangways across Morgan's-lane, Tooley-street, Rotherhithe, to connect the first, second, third, and fourth floors respectively of warehouses on each side of the lane (Mr. A. Webb for Messrs. Boord & Son).—Refused.

Line of Frontage and Space at Rear.

Greenwich.—The frontage of six houses with one-story shops proposed to be erected on the north side of Humber-road, Westcombe-park, Greenwich, eastward of Halston-road; and the erection of such houses and shops with irregular open spaces at the rear (Mr. J. H. Haire).—Refused.

Formation of Streets.

Wandsworth.—That an order be issued to Messrs. Tompkins & Barker sanctioning the formation or laying out of a new street for carriage traffic on the Woodlea estate, on the eastern side of the Bedford Hill-road, Balham. That the name Dornton-road (in continuation) be approved for the new street.—Agreed.

Brixton.—That an order be issued to Mr. J. Fasnacht sanctioning the formation or laying out of three new streets for carriage traffic upon the Lambeth Wyke Estate, Hackford-road, Brixton (for Captain T. T. Jennings, R.N.). That the names Liberty-street, Morat-street, and Isabel-street be approved for the new streets.—That Mr. J. Fasnacht be informed that his application for consent to the formation of streets on the above-mentioned estate, having been further considered, the Council sees no reason to depart from its decision, not to grant the application.—Agreed.

Wandsworth.—That an order be issued to Mr. L. S. Rogers sanctioning the formation or laying out of two new streets for carriage traffic out of Yukon-road, Balham Hill, Clapham (for Mr. J. Jenkins).—That the names Lynn-street and Beira-street be approved for the new streets.—Agreed.

Peckham.—That an order be issued to Mr. T. Wilson, refusing to sanction the formation or laying-out of a street 20 ft. wide for foot traffic only in continuation of a way leading out of Elmington-road, Camberwell.—Agreed.

Artisans' Dwellings.

Bermondsey.—That the Council do make an order as follows:—Whereas Mr. J. Moore, of 33, Finsbury-square, London, E.C., on the 18th day of March, 1899, under the provisions of Section 42 of the London Building Act, 1894, delivered on behalf of the Improved Industrial Dwellings Company, Limited, at the County Hall, plans of a block of intended dwelling-houses, to be inhabited by persons of the working class and proposed to be erected, not abutting upon a street, between Waleran-buildings, Old Kent-road, and the garden at the rear of No. 155, Old Kent-road, Bermondsey. . . . . Now the Council, in the exercise of its powers under Section 42 of the said Act, but in no way otherwise than under such section, does by this order sanction the said plans. . . . .—Agreed.

Means of Escape from the Top of High Buildings.

Strand.—That Messrs. White & Co. be informed that the Council, in the exercise of its powers under Section 63 of the London Building Act, 1894, is prepared to grant a certificate in respect of the means of escape in case of fire to be provided for the persons dwelling or employed on the topmost floor of a building proposed to be erected on the site of Nos. 173 to 179 (inclusive), Strand, and No. 2 Norfolk-street.—Agreed.

Buildings for the Supply of Electricity.

Southwark, West.—That the Council do approve of the plan submitted with the application of Mr. F. Bailey on behalf of the City of London Electric Lighting Company, Limited, for the construction of a furnace flue to the western chimney shaft and the consequent alterations to the office building at the company's works, Bankside, Southwark; and that the Council do also authorise the construction of such furnace flue, and the alterations to the office building as shown upon the said plan.—Agreed.

* Names of applicants are given in brackets. Buildings are new erections unless otherwise stated.

TRADE CATALOGUE.

WE have received from the Edison & Swan United Electric Light Company, Limited, a supplementary section of their fittings catalogue containing a description of their high voltage lamps and fittings, including switches, fuses, cut-outs, ceiling roses, distributing boards, lamp holders, wall plugs, &c. In the preface to this catalogue they state that the adoption of high voltage supply by the leading Supply Companies and Corporations has rendered necessary an entire change in the design of electrical accessories for use in those circuits. It is satisfactory to find that manufacturers have so soon eliminated all the possible dangers from shock and fire which were so freely prophesied when high voltage was first introduced. In some cases the danger from shock has been eliminated by the use of their patent anti-shock liner in switches and holders, and wherever a metal cover is required, and in other cases by using porcelain covers and handles. The danger of "arcing" in fuse blocks has been avoided by the insertion of porcelain walls between the terminals and in fuse boards by the insertion of an extra long fuse, care being taken also to increase the distances between the fuses so that there is no danger of rupturing the adjoining fuses when a fuse blows. We were specially struck with the excellence of the design of the "Ediswan" anti-shock holder. It merits its title of the "ideal holder for high-voltage circuits." Amongst the lamp novelties we may mention the "queen of lamps." In this lamp the top reflecting part of the bulb is made of opal glass, and this produces a very soft, diffused light, not nearly so trying to the eyes as the light produced by silvered bulbs. Considering the excellence of the fittings supplied the prices are moderate. No electrician can afford to be without this catalogue. We note that the large development of the business carried on by the company has necessitated the opening of a new factory in Walsall for the manufacture of fittings, and one at South Benwell for the manufacture of lamps.

BOOKS RECEIVED.

MODERN DRAINAGE INSPECTION AND SANITARY SURVEYS. By Gerard J. G. Jensen, C.E. (Sanitary Publishing Company.)

GREENWOOD'S TIMBER AND STONE CALCULATOR. Seventh edition. (Baxendale & Co.)

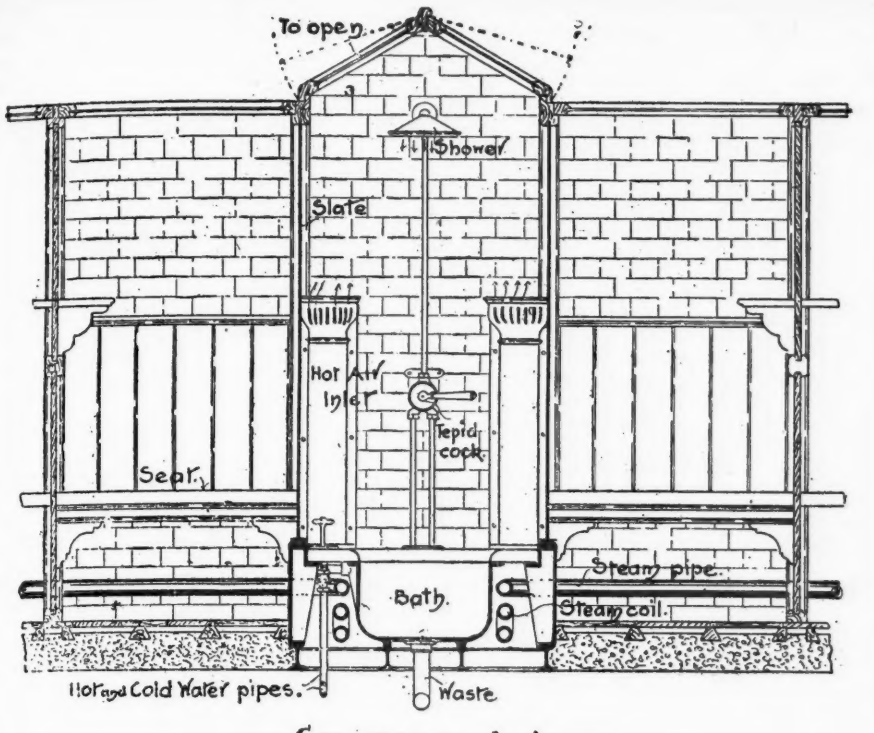
Correspondence.

To the Editor of THE BUILDER.

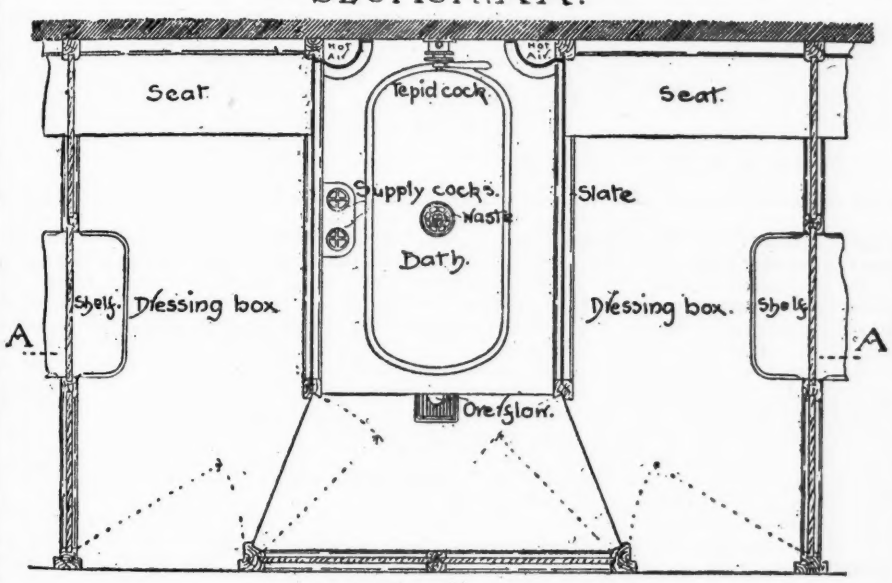
PUBLIC BATHS.

SIR,—I read with considerable interest the report which appeared in your issue of the 11th inst. of the paper of Mr. A. Hessell Tiltman, on "Public Baths and Washhouses," read before the Royal Institute of British Architects, and of the discussion which followed. I have since read the paper and discussion as printed in the *Journal* of the Institute.

The author of the paper, in his introduction, proposes to give his "personal views upon the ordinances which should govern the arrangements of baths and washhouses *in the future*" (the italics are mine), and after drawing attention to the faults of the prevailing systems, proceeds to describe a proposed "system of central and branch establishments"—the central establishment to consist of swimming baths, slipper baths, and hot-air baths, and the branch establishments to be of two given types—(a) consisting of slipper baths and washhouses, and (b)consisting of rain-douche baths, now being so largely adopted in Austria, Germany, and the United States. Now I am sure it will be of interest to your numerous readers, and may prove a stimulus to



— SECTION A A. —



— PLAN. —

Diagram illustrative of the "Harpur" warm lavatories, which consist of a central closed compartment with a dressing-box on either side. The central compartment is maintained at a temperature of 110 deg. Fahrenheit by means of steam coils placed beneath the bath casing. In this compartment a shallow bath, with hot and cold water laid on, and shower over, are provided. The object of the "Harpur" baths (warm lavatories) is to provide an arrangement by means of which the bather can obtain, for a small payment, the cleansing facilities of the Turkish bath, and, in addition, enjoy the advantage of a dip in the swimming bath.

further exertion in the direction indicated by Mr. Tiltman to know that over six years ago I proposed a similar scheme of central and subsidiary baths to my Council which was adopted, and that for the last three years we have had in operation an establishment, unique in character, and carrying out in a very successful and highly-appreciated manner many of the suggestions now advocated in Mr. Tiltman's paper and the discussion which followed.

I therefore forward you a detail drawing of the warm lavatory I have adopted in lieu of the ordinary slipper bath, the publication of which, I feel sure, would, by comparison and contrast with the former proposals, open the way to further discussion of a subject the importance of which, I think, is not overestimated in Mr. Tiltman's paper, and which I am convinced is far from having received a satisfactory solution.

One thing that has struck me in the perusal of Mr. Tiltman's paper is the fact that, while he comments very largely on the advances made in Continental countries and the United States, and recommends the adoption of some of the practices of these countries instead of an "obstinate perseverance in our present somewhat blundering system," no mention is made of the attempts of our own countrymen, who have not only advocated the proposed departure from our older system, but have done pioneer work in the endeavour to introduce a more rational way of bathing.

The successes in a few cases, and more generally the failure of these efforts, are very instructive, and their careful consideration will save further experimenting, with its consequent waste of the public money. In illustration, I shall only refer to two points one in connexion with the swimming-bath and one as to the washing-bath :—First, as to the swimming-bath. Mr. Tiltman mentions the necessity of all bathers, without any reference to position in life or habits, undergoing a cleansing process in a douche-room specially provided for the purpose before entering the swimming-pond, and it is asserted that "every bather in Germany and Austria certainly observes this rule." But the experiment has already been tried in this country, with most discouraging results; and here I refer not to places where there is merely "a cold shower apparatus or two placed among our dressing-boxes," but where a conveniently arranged room has been provided that was inviting and not repulsive in any sense of the word. One naturally asks for an explanation, and I believe it is to be found partly in the conceit and prejudices of the people themselves; for where is the average Englishman that does not flatter himself that he belongs to the cleanest nation on the face of the earth; and that he himself can be dirty is the last fact that he will admit, even to himself, much less to others; and, consequently, I have known all sorts of tricks to be resorted to, rather than submit to what is thought to be the humiliating compulsory wash.

And then one cannot shut one's eyes to the fact that there is a strong objection, especially among the working and lower classes, to washing all over in public. And it is this consideration which, I understand, has induced Mr. Tiltman to prefer the German to the Austrian arrangement of rain-douche baths. I shall, therefore, look forward with much interest for the result of the introduction of improved douche-rooms in the projected baths.

Secondly, as to the washing baths. In 1889 Mr. C. C. Walker read a paper on "Baths for the People" before the Worcester meeting of the Sanitary Institute,* in which he detailed the arrangement of a "Soap and Spray" bath that he had erected for his workpeople at Donnington, near Newport, Shropshire, and which had proved an unqualified success; and Mr. T. Roger Smith, in a paper read at Brighton in 1890,† referred to these baths and intimated that he was providing similar baths in a bathing establishment in the east of London, which he had every reason to hope would be as successful as in Mr. Walker's own establishment, adding that "though as a novelty they may at first be distrusted, my belief is that they can hardly fail to become liked, for I know of nothing so well adapted to the requirements of working men." In 1893 I visited these baths, and was not only surprised but disappointed in finding that the spray-bath, after undergoing a modification by substituting side sprays for the overhead shower was scarcely ever used, and it was only by being very persistent that I induced the attendant to show me the same. My own observations have led me to conclude that the failure of these baths was owing to the fact that the public were offered the choice of two forms of bath, one conformable to their own ideas of what a bath should be, and the other an untried novelty; for, despite all that can be said about "slipper baths and other abominations," the preference of English people is for a bath *in* which they can wash and not *at* or *under*. And when you consider that this habit is the result of the custom of generations, it is not to be wondered at that it cannot be removed in a day. The late Dean Stanley wrote somewhere of the folly of seeking to impose the customs of other countries, and other times upon a people in opposition to their own habits and tastes, and it is this consideration that I would earnestly recommend to those contemplating the designing or providing of "Baths for the People," and which led me to adopt the form of warm lavatories described in my report and illustrated by the accompanying detail drawing.

One point I should strongly urge is that in any attempt to introduce a new form of bath, the old form of slipper bath should be entirely abandoned, otherwise if the two forms of bath are provided in the same establishment the public will invariably ask for the one they are best acquainted with, and the new form will never receive a fair trial.

I would also call attention to the fact that the main difference in Mr. Tiltman's scheme and my own is that in the branch establishments I arrange the washing baths around a small swimming bath or plunge, so that bathers who so desire may follow up their wash with a five or ten minutes' swim, in lieu of the cold shower, thus providing in a very convenient form the suggestion made by Mr. E. Harding Payne (in his contribution to the discussion on Mr. Tiltman's paper) of an easy communication between the first class slipper and swimming baths, so that bathers could have a cold plunge after a warm bath, a luxury which would, he feels sure, prove popular.

Nor do I agree with the proposal to adopt the improved form of bath, for the very poorest only of the three classes of bathers for which the public baths are supposed to exist, still retaining the slipper bath for the central and better class of branch establishments.

Surely this would give the impression that the "rain douche" is something which the poorer classes had to put up with on account of their inability to pay for better appliances. This letter has far outgrown my intentions in taking up my pen to write you, but if it tends to open up discussion and bring the experience of others to bear upon the subject the object I have in view will be gained, with, I trust, manifest advantage to the community at large.

W. HARPUR, M.Inst.C.E.

Cardiff, February 24.

*** The publication of this letter has been unavoidably deferred for want of space.—ED.

HARROGATE PUMP ROOM COMPETITION.

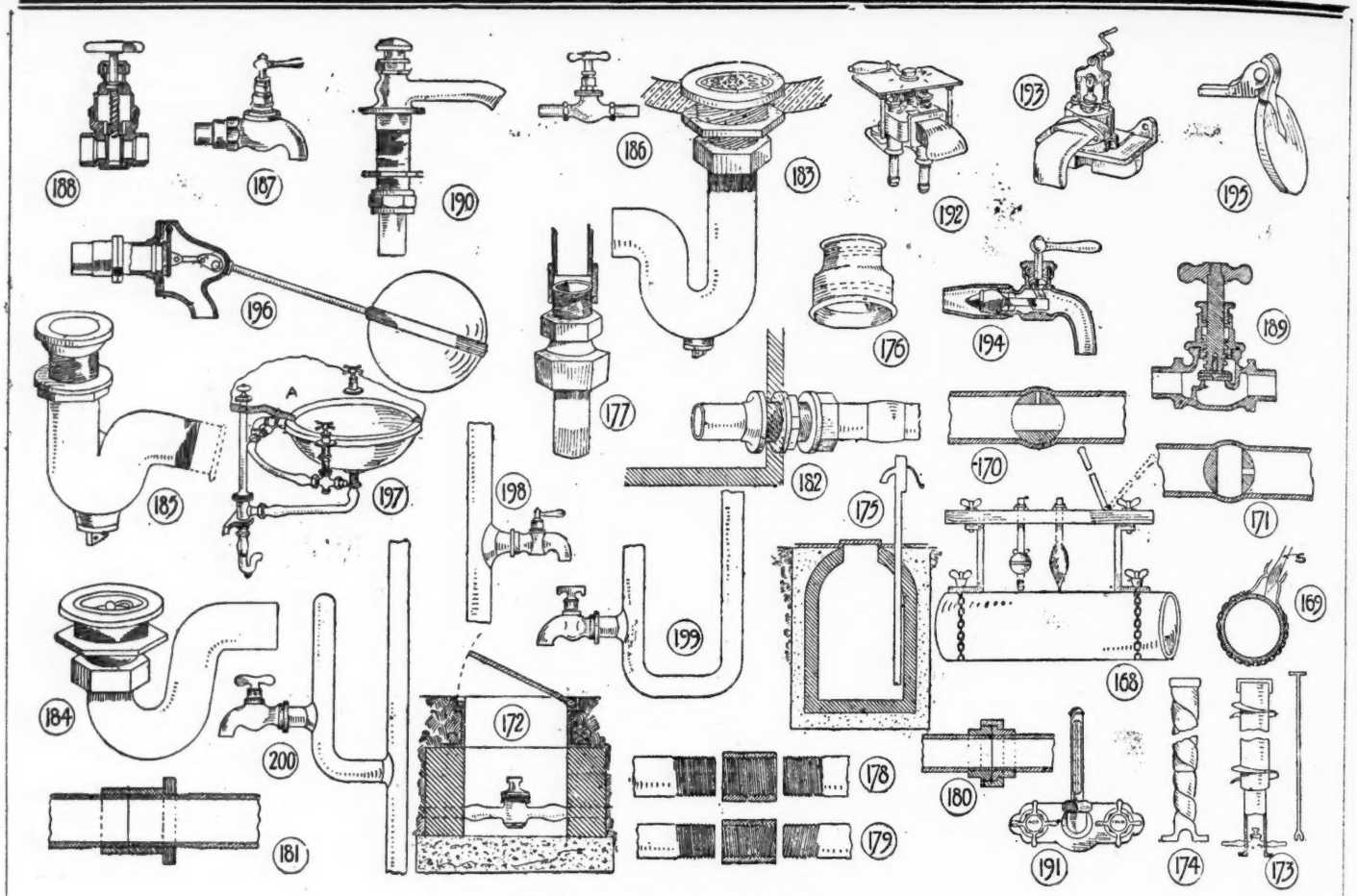
SIR,—In your issue of the 18th ult. you commented upon the result of this competition. As the competitor whose designs were placed first in both competitions, viz., the Rebuilding and the Enlargement, I should like to add a few words to what you then said.

In the Harrogate *Advertiser* of the 18th ult. a report of the proceedings of the Town Council is given, and during the discussion upon the Pump Room Committee's report one of the Aldermen admitted that the competition was promoted only to please those members of the Corporation who wished for a new building.

Last week I received a letter from the Borough Surveyor, stating that he is instructed to say "that the Committee consider that they have acted in a perfectly fair and honourable manner."

As you stated in your issue of the 18th ult., the competition was evidently promoted "as a little

* See the *Builder* for October 12, 1889.—ED.
† See the *Builder* for September 6, 1890.—ED



Illustrations to Student's Column.

amusement," and this is what the Corporation of Harrogate consider "fair and honourable behaviour."

This same Corporation have advertised another competition, inviting designs for a kursaal. I think it is only "fair and honourable" that intending competitors should know what treatment they are likely to receive in return for the labour and expense incurred in preparing their designs. This competition, too, is probably promoted only to please those members of the Corporation who wish for it, and not with any intention of erecting a kursaal.

F. ANDERSON.

The Student's Column.

ARCHITECTURAL HYGIENE:

XIV.—WATER SUPPLY, FITTINGS, &c.

WE will now briefly consider the means of connecting and controlling the water-supply to the house under the following headings :—

1. *Connexions to Main.*
2. *Underground Cisterns.*
3. *Unions and Junctions.*
4. *Taps and Fittings.*

1. *Connexion to Main.*—The inconvenience of having to shut off the water supply and empty the main pipes each time a new connexion is required has caused the production of several machines designed to enable a service pipe to be connected to the main while the pressure is unreduced in the latter.

Fig. 168 is a section of such a machine. It is in the form of an oblong box of cast-iron fitted to the curve of a 6-in. pipe. It is held on the main to be "tapped" by two chains drawn very tightly round the main pipe by means of long screw-bolts and nuts. A rubber washer between the flange of the machine and the pipe makes a water-tight joint. It is held down by four fly-nuts on bolts passed through slots, which enable the lid to be moved backwards and forwards by means of a lever. In the lid are two holes fitted with stuffing-boxes. The holes are exactly the same distance apart as the length that the lid can be moved by the lever. Through one hole in the lid is passed the stem of a combined drill and tap, which, being rotated by means of a ratchet and pressed down by a screw, drills a hole through the pipe. The stem of the drill forms the tap, and the hole is drilled and tapped by the one operation.

The arm is then withdrawn, the thumb-screws holding down the lid are eased, the lever drawn over as shown by the dotted lines, and the thumb-screw is tightened. The second hole in the lid is now over the hole in the pipe. Through this hole, before the lid was put on, the stem of a rimer was pressed, which latter was previously wedged into one end of a closed stop-cock. By the movement of the lever this is brought directly over the hole in the pipe. It is pressed in and screwed up, and the machine is taken off, leaving the stop-cock screwed into the water-main. A slight leakage will occur while the thumb-screws are eased and the lid is being moved, but the boxful of water should be all the loss of water that occurs during the operation.

Another method of tapping the main is shown by fig. 169, which is a diagrammatic sketch of a smaller and more portable and altogether more convenient instrument. It is made in two halves, which are joined by a rubber joint longitudinally. It is circular in plan and is held on to the pipe by one chain, tightened up by means of a nut and screw. There is a rubber joint between the machine and the pipe, and there is also a combined drill and tap as in the machine previously described.

The stop-cock is, however, much longer. The machine shown in fig. 168 is used on the top of the pipe, and the service was connected by means of a bent union. This machine is used on the side of the pipe, and the service is connected by means of a straight union. The machine being in position, the drill is passed through the gland shown, the valve is pushed up, the drill held up to the pipe by means of a screw, and rotated by a ratchet. When the hole is drilled and tapped the drill is withdrawn, the valve in the machine falls against the rubber seating, and the pressure of water behind it renders the valve watertight. The stop-cock S, the stem of which must be of the same diameter as the stem of the drill, is pushed through the gland and forces the valve open, and is then screwed into the hole in the main which has already been tapped.

The machine is then taken off by disconnecting the two halves.

Fig. 170 is a sectional plan of a "stop and waste" with the communication open. Fig. 171 is the same with the water shut off and the pipes, at the side on which there is no pressure, are thus allowed to empty themselves. By using a stop-cock of this kind in the roadway the water can be shut off from the house, and the rising main thereto can thus be emptied. Where these stop-cocks are fixed and the water shut off during frost, burst pipes are obviated on account of the water being drawn off. Besides the stop-cocks screwed into the main pipe—where tapping machines are used—there is usually a stop-cock in the road or garden under the control of the water company or corporation. Fig. 172 shows the ordinary method of gaining access to the shutting-off stop-cock in a road. A dry brick well is built to within about 6 in. of the surface, and a strong cast-iron box with hinged lid is bedded in the roadway.

Figs. 173 and 174 are cast-iron telescopic tubes provided with flanges at each side of the arch over the pipe. The lowest part is fixed, and the earth is filled in around it. Fig. 173 has two screws on the outside of the upper tube. When the earth is filled in up to the blades of the screws a turn of the tube one way or the other will raise or lower the upper tube. The two tubes in fig. 174 are cast in a special spiral form. The upper is being passed over the lower, and it can be turned until it is screwed down to the required height.

In fig. 173 the stop-cock, under the key, has a flange threaded on the outside to screw into a 2-in. barrel union, a piece of barrel of the requisite length is screwed on, and a cap on the top keeps out the dirt and affords means of access.

2. *Underground Cisterns.*—Fig. 175 is a section of an underground cistern, circular in plan, and bottle-shaped in section ; it is built of brickwork with puddled clay backing, and is covered with a stone top, and it is also fitted with a pump. The suction pipe of the pump should reach to within about 6 in. from the bottom of the cistern, so as to prevent the raising of the sediments up the pipe. The suction pipe should be made of iron, as the water in the case of lead may dissolve the metal in the pipe. Water stored in these cisterns is found to be colder in summer and warmer in winter than that supplied through ordinary town mains. It should be cleansed at least once a year. The access to the cistern is by means of a ladder from the top.

3. *Unions and Junctions.*—Fig. 176 represents an india-rubber closet joint for connecting the closet end of the flushing pipe with the fitting. This is accomplished by tightly binding round the two ends of the rubber cone with copper wire, as shown by the dotted lines. This is illustrated *in situ* in fig. 197, which shows a similar connexion of the supply pipe to a lavatory basin.

Fig. 177 illustrates an ordinary barrel union with one end formed with a male screw for iron pipe (*note:* a *male* screw is one cut on the outside of a pipe, a *female* screw is one cut on the inside of a pipe) and the other end fitted with a *cap* and *lining*, the latter with a turned end for connecting to a lead pipe.

This joint is used for connecting a lead to an iron pipe. The lining is attached to the lead pipe by means of a wiped soldered joint, the screwed end being attached to the wrought-iron barrel by means of a socket, as shown in this figure. This is further illustrated by figs. 178 and 179. The latter demonstrates the use of right and left hand sockets.

Fig. 180 shows a barrel union for joining two iron pipes. It will be observed that this method obviates the necessity of using left-hand dies and taps for cutting the male and female threads.

Fig. 181 shows a "connector" joint, and is much used in hot-water work. The back nut is screwed on the end of a previously cut long thread, and the socket is then screwed on. The pipe to be connected is then placed in position and the socket is screwed over it (as shown by dotted lines). The back is then screwed close up to the end of the socket very tightly with a packing of red lead and hemp between, so as to prevent leakage.

Fig. 182 shows a boiler screw with *cap* and *lining*. The dotted lines show the outline of a cistern. It will be seen that the fly nut secures the fitting to the cistern. The cap secures the lining to the boiler screw, and the lead pipe is connected to the lining by means of the ordinary wiped solder joint. Inside the cap a leather washer is always used in order to form a perfect joint between the ends of the lining and the boiler screws.

Fig. 183 illustrates the junction of a waste to a bath. It will be seen that this junction is similar in principle to that last described, the hatched portion representing the thickness of the bath.

Fig. 184 represents another form of bath waste, which will be readily understood, the only difference being that a plug is substituted instead of a valve.

Fig. 185 shows a similar fitting for a basin, &c. The dotted lines illustrate how this may be varied, so as to have a head at the extremity of the outlet, which will enable the fillet to be caulked to a cast-iron pipe.

4. *Taps and Fittings.*—The idiosyncrasies of the various water companies render the fittings allowed by them to be varied according to their officials; so that fittings which are permissible and are even recommended in some districts are quite prohibited in others. Sanitary fittings have been previously described. Fig. 166 shows the fitting of a stop-cock for lead pipes, and fig. 167 shows a section of Lord Kelvin's patent bib-tap, which explains itself.

Fig. 186 shows an ordinary screw-down valve, which is shown performing the functions of a stop-cock so as to shut off and regulate the supply. This valve is shown with two unions for connexion to lead pipe. This constitutes a much better arrangement than having merely the ends of the valves *tinned*, as in making the joint the valve does not become unduly heated, and obviates the danger of damage to the sealing.

Fig. 187 shows a quarter-turn bib-valve, which should only be used on a low-pressure system, as otherwise the pressure of the water would tend to open the valve.

Fig. 188 represents a section of a clear-way wheel valve, which is useful in connecting fittings where the pressure is low and it is desirable that the valve should not check the force of the supply. Fig. 189 is a section of a quick-turn full-way valve, the full-way being obtained by the extra sectional area of the body of the tap. Fig. 190 shows a spring valve, which is sometimes used for lavatory basins, where the supply of water is limited and it is desired that no waste shall take place. Fig. 191 shows a bath fitting with a mixing box and thermometer, and is useful in obtaining water at any required heat.

Figs. 192 and 193 illustrate two public bath valves, which are used for the purpose of regulating the supply and temperature of the water to the users of the bath by the attendant outside the bath-rooms. Fig. 194 gives a sectional view of a *Fuller Bib-tap*, which is much used on the American continent. The action is extremely simple; by a half turn of the lever the spindle forces the rubber ball up the supply pipe, and the water is immediately released through the tap. It will be seen that when closed the pressure of the water helps to keep the tap watertight.

Fig. 195 represents an ordinary flap valve, mostly used for the ends of overflow pipes, in order to prevent the ingress of birds and dirt, &c. It is also useful in the prevention of the cold weather affecting the ball valve.

Fig. 196 represents a patent full-way ball valve by Messrs. J. Tylor & Sons, and is to be recommended, owing to its simplicity and to the fact that it acts directly, and a full supply is obtained and would be particularly valuable where only a low pressure is obtainable.

Fig. 197 shows the fittings and connexions to a lavatory-basin in which the taps are placed on either side and the same inlet is used for the hot and cold supply to the basin, which is connected to a flushing rim. This causes the basin to be self-cleansing, which is an advantage; the waste should be carried to the outside of the wall direct and fitted with one of the flap-valves previously described.

Whenever a *Fuller Bib-tap* or a spring self-closing tap is used, they should always be fixed with an air chamber. If these taps are used without air chambers their sudden closing gives rise to the loud knocking sound which is technically known as water hammer. The explanation of this is that when water issues from a tap the whole body of the water in the pipe is in motion. When, however, a screw-down tap is closed the motion of the water is gradually arrested. In the former instances, therefore, the sudden arrest of the motion causes a jarring in the pipe unless air chambers are fixed. When this is done the air in the chamber is compressed and acts as a buffer.

Fig. 198 shows an air chamber when the tap is on an ascending pipe, fig. 199 when the tap is on a descending pipe, and fig. 200 when the tap is on a rising main or on a pipe which also supplies a higher fixture.

GENERAL BUILDING NEWS.

NEW CHURCH, ROTHES, MORAYSHIRE. — The foundation-stone of a new Free Church, hall, session-house, and vestry has just been laid by Sir W. Henderson, ex-Lord Provost of Aberdeen. Mr. G. Sutherland is architect.

WILLIAM DAWSON MEMORIAL CHAPEL, BARWICK, LEEDS.—The foundation-stones of this building were laid on the 3rd inst. In addition to the chapel there are to be school-room, vestry, and caretaker's cottage. Mr. G. F. Danby, of Leeds, is the architect. The new chapel, which will accommodate a congregation of 220, will be provided with an ornamental turret rising to the height of 60 ft. The school-room is to adjoin the chapel, from which it will be separated by a removable partition. The principal contractors engaged are Mr. J. Richardson, of Chapeltown; whilst Messrs. H. Atkinson & Sons, of Leeds, are responsible for the joiner work. The whole cost of the building is estimated at 2,700*l.*

MEMORIAL CHAPEL, NEWPORT, NEAR DUNDEE. —On the 1st inst. the Students' Section of the Dundee Institute of Architecture visited the Vicarsford Cemetery, Newport, and inspected the Memorial Chapel erected there. Mr. T. Martin Cappon, President of the Dundee Institute and architect for the Chapel, met the students, and gave a description of the building.

CONGREGATIONAL CHURCH, PERTH.—The new Congregational Church, Perth, is built of red stone and the style is Gothic. The main entrance is from Kinnoull-street, where there is a vestibule with coved ceiling. On each side are stairs leading to the gallery, while on the left and right of the entrance are ladies' and gentlemen's cloakrooms, &c. The interior of the building is about 51 ft. long and 44 ft. wide, with a slight incline upon the floor. The building is seated for 650. At the back of the building are the vestry, session-house, and hall, entrance being got to those premises from Murray-street or by the church. The work has been carried out by the following tradesmen:—Masons, Messrs. Fraser & Morton; joiners, Messrs. Hay & Son; plumbing and heating apparatus, Messrs. Frew & Son; slater, Mr. Chalmers, Pitcairngreen; plasterers, Messrs. Mackay & Son; glazier, Mr. Alexander; painters, Messrs. G. R. Douglas & Son. The architects were Messrs. Steele & Balfour, Glasgow; while Mr. George Henderson, was the clerk of works.

ABERDEEN CHURCHES.—Free Greyfriars Church, George-street, is to be reconstructed and enlarged, according to plans by Mr. Alexander Mavor, architect; and alterations are to be made on St. Joseph's Church, Tanfield-walk, from designs by Mr. Victor Mitchell, architect.

WESLEYAN METHODIST CHAPEL, LOW BRADFIELD, YORKS.—A new chapel for the Wesleyans has just been opened at Low Bradfield. The exterior is faced with coursed local wallstone, with dressings of Matlock stone. The floor of the porch is tiled, and the chapel, which is 53 ft. by 27 ft. 6 in. inside, will accommodate 190 adults. At the end of the chapel is arranged an octagonal recess, in which is placed the rostrum. There is also vestry and other accommodation. The work has been carried out from the designs and under the supervision of the architect, Mr. W. J. Hall, of Sheffield, by the following contractors: Masons' work, Messrs. J. Fox & Son, Bradfield; joiners' work (except seating), Mr. Frank Marsh, Stannington; plumbing, Mr. G. W. Rustling, Sheffield; tiling, plastering, and painting, Messrs. C. Chadwick & Sons, Sheffield; and the carving by Mr. F. Tory, Sheffield.

PROPOSED ALTERATIONS AT ALFRETON PARISH CHURCH, DERBYSHIRE.—At a social gathering of Church people at Alfreton, recently, the Vicar explained several proposals for structurally improving the parish church. The organ is now placed on the north side of the nave, some distance from the choir in the chancel. This arrangement does not work well. It is proposed to lengthen the chancel, increase the height, and build an organ chamber on the south side of the chancel. The total scheme will involve an outlay of 1,100*l.* The architect is Mr. H. Fowler.

CHURCH RESTORATION, KNOWLE, WARWICKSHIRE.—Plans and specifications for new vestries, organ chamber, &c., for Knowle Church have been completed by Mr. Chatwin. Messrs. Collins & Godfrey, of Tewkesbury, are the contractors.

MISSION CHURCH, NUNNEY.—A mission church in the parish of Nunney, near Frome, was opened on the 7th inst. It is a building of local stone with Bath stone windows and dressings, the roof being open timbered, boarded below, and covered with dun-coloured angular Bridgewater tiles and a western spirette. It has woodblock floors, and includes nave, chancel, and vestry, and has been erected for 2*l.* 1s. 3d. per sitting; the architect being Mr. E. H. Lingen Barker, of London and Hereford, and the contractor Mr. C. Barnes, of Frome.

PUPIL TEACHERS' CENTRE, BRISTOL. — A new pupil-teachers' centre has just been erected by the Bristol School Board on the Broad Weir, and partially in Castle Green, from designs of the architects, Messrs. La Trobe and Weston. The building is in the Renaissance style, and carried out in terra cotta and red brick, the chief elevation being on the Broad Weir, but entrances are provided on both sides, giving access to a wide staircase, which has glazed brick dados. The building is heated by hot water apparatus, supplied by Skinner & Co., and lighted by electricity. The general contractors have been Messrs. Hughes & Weeks, of St. Philip's.

CONGREGATIONAL SCHOOL, CHESTERFIELD. — The Congregationalists at Brampton have acquired a piece of land almost opposite the chapel in Chatsworth-road, and it is intended to build a new chapel and schools upon it. The foundation-stones were laid on the 3rd inst. of the new schoolroom. The whole scheme, including the chapel, will cost, it is estimated, about 1,200*l.* The architect of the new school is Mr. C. Rollinson, Chesterfield, Mr. Rhodes being the contractor.

HOTEL, JOPPA, EDINBURGH.—The new Queen's Bay Hotel at Joppa has just been opened. The building is lighted throughout by electricity. The architect of the new building was Mr. Peter R. M'Laren, Edinburgh; the builders, Messrs. William Turner & Sons, Edinburgh.

NEW WING, LORETO ABBEY, RATHFARNHAM, DUBLIN.—The new wing at the Loreto Convent, Rathfarnham, has just been completed and opened. The addition was built by Messrs. Michael Meade & Son, from designs prepared by Mr. W. H. Byrne, architect, and under his superintendence. The wing measures 100 ft. in length by 40 ft. in width, and its height is 60 ft. There are four stories. In the upper story is the dormitory, which extends over the width and length of the building. In the basement are the cloak-rooms, bath-rooms, &c. In the other stories are the class-rooms and study halls. There are eight class-rooms and four study halls.

THE CRITERION RESTAURANT.—The opening of the newly-constructed east-room of the Criterion was inaugurated on the 6th inst. The present directors recently determined to bring the restaurant thoroughly up-to-date. To this end, an entire reorganisation of the various arrangements has been made, and structural alterations and embellishments have been carried out. The architect under whose direction the alterations have been effected is Mr. Frank T. Verity; Messrs. Waring & Sons, of Oxford-street, are responsible for the decorations; while Messrs. Starkie Gardner & Co. have supplied the wrought-iron work for the minstrels' gallery. The marble and mosaic work in the buffet has been entrusted to Messrs. Bourke & Co., of Newman-street, W. A new entrance has been built in Jermyn-street, giving an approach to the east-room, the banqueting-rooms, and the grill-room.

LIBERAL CLUB, HIGHER TRANMERE, CHESHIRE. —The foundation-stone of a Liberal club in Church-road, Higher Tranmere, was laid on the 8th inst. The building will consist of a reading-room, assembly hall for 500 people, and a billiard-room. Mr. T. T. Rees is the architect, and the builder is Mr. John Lee.

QUAY ACCOMMODATION, NORTHCORNER, DEVONPORT.—A block of buildings, situated at Northcorner, Devonport, and comprising a warehouse, a waiting-room for the accommodation of traders and passengers, &c., was opened on the 7th inst. The

warehouse occupies the north-west side of the building, and at the rear of the warehouse is a store-yard. The waiting-room faces the Hamoaze, and on the Cornwall-street side of the building is a pier-master's office and a smaller warehouse. The materials used were red bricks and terra-cotta, with Portland stone dressings. The work has been carried out by Mr. H. E. Skinner, under the supervision of Mr. J. F. Burns, the Borough Surveyor.

WORKHOUSE LAUNDRY, LEEDS.—At the Leeds Workhouse a new laundry has just been erected at a cost, including that of machinery, of about 12,000*l.* It is a brick building, lined in the interior with white glazed bricks, and lighted from skylights in the open iron roof. The structure is divided into several sections, with glass partitions between. The laundry has been designed by Mr. Thomas Winn. The machinery has been supplied by Messrs. Bradford and Messrs. Summerscales, and the ventilation arrangements have been provided by Messrs. W. & R. Legard, of Bradford.

FOREIGN.

FRANCE.—MM. Adrien Chancel, Loviot, Ch. Lucas, Newnham, and Poupinel have been elected by the Government members of the French section of the Permanent Committee of the International Congress of Architecture in the 1900 Exhibition. ——The works of the chapel which is being erected on the site of the Charity Bazaar are being carried on with great rapidity, and the architect, M. Guilbert, hopes that it can be inaugurated on May 4, 1900. M. Albert Maignan has been commissioned to paint a large allegorical picture in the cupola of "Christ receiving into his glory the victims of the Charity." The frame of this composition is to be executed by the sculptor Hiolin, who is also to make two funeral monuments with figures of women in long veils, which are to be placed in the annexes on the left and right of the chapel. M. Daillon is to make a figure of the Virgin in leather, gilt.—— The Museum at Marseilles has just received seventy drawings of Puvis de Chavannes, given by his heirs.——Four large panels and four smaller pictures, by M. F. Humbert, have been placed in the Pantheon. They represent the apotheosis of the Family, the State, and Humanity. —— M. Falguière has just finished a statue of the "Drame Lyrique" which is to be placed in the Opéra Comique as a companion to the "Comédie Lyrique." ——The Paris Municipal Council has a great scheme for building several hospitals, besides enlarging and rebuilding asylums and other hospitals. The cost of this is estimated at 72 millions of francs.—— The service of Ponts and Chaussés is going to rebuild the two bridges on the Ile Saint Denis.—— M. Bréasson, architect, has just finished the new Mairie at Brunoy, the monumental façade of which faces the Place de la Jeunesse.

COLOGNE.—The Cathedral at Cologne, which has for so many years been in the hands of the builders for a thorough overhauling, may now be said to have had its repairs completed in every way, and to be in excellent condition. The street improvements around the Cathedral are also almost completed, and an excellent view of the building is now obtainable from all sides. The new squares which have been formed have been well paved and partly laid out as gardens with grass and shrubbery. New buildings are springing up rapidly on all sides. Perhaps the most remarkable feature in the surroundings of Cologne Cathedral is the arrangement of the new railway station, and the large railway viaduct, in such a manner as to scarcely interfere with the general aspect of the Cathedral. Every possible care has been taken, both in the station buildings and in the constructional ironwork, to prevent anything that might be too conspicuous or tend to injure the general effect. It was certainly a dangerous experiment to have a large new station and viaduct within a few yards of a cathedral; but, thanks to the care observed in every direction, the practical modern requirements have been overcome without any detriment to the artistic and archæological interests.

MISCELLANEOUS.

PROPERTIES FOR SALE.—(1) In June next will be offered for sale, by auction, the Grange estate, about forty acres, at Chalfont St. Peter, Bucks. That part of the county through which flows the Mease, or Misbourne, is closely associated with the memories of Milton, the Fleetwoods, the Ellwoods, and the seventeenth-century Quakers. Entering the Chalfont valley from Denham, one passes Chalfont Park: the house was built by Chute for General Churchill: and then on the right hand is the Grange, where lived the Peningtons, and whence Isaac Penington was taken (1665) to Aylesbury Gaol. Isaac Penington had married Lady Springett, whose daughter, Gulielma Maria, married, in 1672 (as his first wife), William Penn, then of Heronsgate, near Chalfont St. Giles. Isaac Penington, William Penn and his two wives, Gulielma Springett (*obiit* 1693) and Hannah Callowhill (*obiit* 1726), together with several of their children, were buried in the neighbouring Quakers' graveyard, known as "Jordans," acquired by Thomas Ellwood, of Bottrells, and others, in 1671. (2) For building purposes, a plot of ground, about half an acre in extent, in West End-lane, Hampstead, being the premises of the "Cock and Hoop," one of the last of the old wayside taverns now remaining in that part of London. (3) In May next, at the Town-hall, Usk, will be offered for sale a portion of the Marquis of Worcester's estates in Monmouthshire. In the sale will be included Monkswood, the ruins of Usk Castle, and the Castle House and grounds. The remains of Usk Castle, rebuilt by the Clares, *temp.* Edward IV., comprise the tower gateway, the great hall, and portions of the outer wall with its flanking towers. Close by was a Benedictine priory, founded by one of the Earls of Clare.

REREDOS, ST. NINIAN'S EPISCOPAL CHURCH, GLASGOW.—On the 2nd inst. the Bishop of Glasgow dedicated the new reredos erected in St. Ninian's Episcopal Church, Glasgow, in memory of the late Mrs. Hutchison. The reredos is built of white Caen stone, and is designed to be in harmony with the style of the church. The centre-piece over the altar consists of a super-altar and three trefoil-arched panels. The arch mouldings are supported on pillarettes of green Genoa marble. The spandrels, capitals, and cornice are carved, while the central arch is accentuated by a slight gablet surmounted by a foliated terminal cross. The whole is flanked by two tall buttressed piers tapering up to crocketted pinnacles. The central panel contains a sculptured quatrefoil medallion, with "the Lamb and Flag" in alabaster, while the two side panels contain alabaster figures representing St. Ninian and St. Margaret of Scotland, the backgrounds being relieved with carved diaper work, gilt. The work has been carried out from the designs of Mr. Henry D. Walton, architect, Glasgow, by Mr. William Vicers, sculptor, Glasgow.

BY-LAWS WITH RESPECT TO NEW BUILDINGS, BIRMINGHAM.—The Public Works Committee report to the City Council that in the series of by-laws with respect to new streets, courts, and buildings which were adopted by the Council on October 4, 1887, by-laws were included (Nos. 21 and 22) from the model by-laws issued by the Local Government Board with respect to the provision of parapets and the carrying of party walls in all new buildings above the roofs of such buildings. In the case of buildings used simply as dwelling houses the committee have long felt that these provisions were unnecessary, and have not insisted upon their being carried out. The plans for the workmen's dwellings to be erected by the Council in Milk-street having recently been submitted for the approval of the Local Government Board, the Board pointed out that they did not comply with these by-laws, and suggested that if the Corporation proposed to revise these by-laws they should do so before the plans were approved. The committee have caused an amendment of these by-laws to be prepared, and such amendment has received the provisional approval of the Local Government Board, and the proposed new by-laws are now submitted for adoption by the Council. The principal by-laws now submitted are as follow:— External Walls.—Every person who shall erect a new public building, a new building of the warehouse class, or a new domestic building which may be intended to be used wholly or partly as a shop or as a place of habitual employment for any person in any manufacture, trade, or business, and may exceed 30 ft. in height, shall cause such part of any external wall of such building which is within a distance of 15 ft. from any other building to be carried up so as to form a parapet 1 ft. at least above the highest part of any roof or gutter which adjoins such part of such external wall, and he shall cause the thickness of the parapet so carried up to be at least 9 in. throughout. Party Walls.—Every person who shall erect a new public building, or a new building of the warehouse class, shall cause every party wall of such building to be carried up 9 in. at the least in thickness:—(1) Above the roof, flat, or gutter of the highest building adjoining thereto, to such a height as will give, in the case of a public building or a building of the warehouse class, a distance of at least 3 ft., measured at right angles to the slope of the roof, or above the highest part of any flat or gutter, as the case may be. (2) Above any turret, dormer, lantern light, or other erection of combustible materials fixed on the roof or flat of any building within 4 ft. from the party wall, and so as to extend at least 12 in. higher and wider on each side than such erection. (3) To a height of 12 in. at the least above such part of any roof as is opposite to and within 4 ft. from the party wall. In every case where the woodwork of the roof projects beyond the face of the building, he shall cause every party wall of such building to be properly corbelled out in brickwork or stonework to the full extent of such projection, and to be carried up above the projecting eaves 9 in. at the least in thickness, to such a height as will give a distance of at least 3 ft., measured at right angles to the slope of the roof. Every person who shall erect a new domestic building shall cause every party wall of such building to be carried up at least as high as the under side of the slates or other covering of the roof of such building. He shall also cause the slates or other covering of the roof to be properly and solidly bedded in mortar or cement on the top of the wall, and shall cause the roof to be so constructed that no lath, timber, or woodwork of any description shall extend upon or across any part of such wall.—The penalty for offending against any of the foregoing by-laws is for every such offence 5*l.*, and in the case of a continuing offence a further penalty of 40*s.* for each day after written notice of the offence from the Town Council. Provided, nevertheless, that the Justices or court before whom any complaint may be made or any proceedings may be taken in respect of any such offence may, if they think fit, adjudge the payment as a penalty of any sum less than the full amount of the penalty imposed by this by-law.

CITY IMPROVEMENTS.—The City Engineer (Mr. D. J. Ross), in his annual report to the Corporation, states that negotiations had been continued to acquire the various interests in the premises required for the widening of the southern side of Fleet-street. The premises 19 and 20, Fleet-street, nearly opposite St. Dunstan's Church, being about to be rebuilt, a favourable opportunity occurred for widening Fleet-street at its western end, and the London County Council had agreed to contribute 20,000*l.* towards the cost, which offer the Corporation had accepted. The improvement at the western end of Cheapside had occupied attention, and many interests had been acquired. All remaining claims were under negotiation. With regard to the large area destroyed by the great fire in Cripplegate, when three and a half acres were demolished, the Corporation gave great attention to the question of effecting improvements. Many schemes and estimates for widening the existing thoroughfares and for forming new streets were prepared, but the London County Council had declined to contribute towards any of them. Failing in obtaining any contribution from the London County Council, the Corporation, considering that any improvement, if carried out, would be of a metropolitan and not a local nature, did not feel justified in proceeding by themselves. The result had been that the properties on the site had been rebuilt on the old lines of frontage and no improvement effected. An arrangement had been made for widening Lothbury on the south side between Prince's-street and the Old Jewry. The London County Council had agreed to contribute one-third of the cost of making the street 50 ft. wide. The Corporation were forming a new street between Fenchurch-street and Crutched Friars—40 ft. wide, the owner of the land paying 6,000*l.* towards the cost—and, on the invitation of the London County Council, were contributing one-half the cost of widening Mansell-street, one of the direct approaches to the Tower Bridge. As regarded electric light, 502 arc lamps were being used, but the question of lighting the side streets by electricity was still under consideration.

NEW CLOCK, LEIGHFORD, NEAR STAFFORD.—A large clock has been erected in the parish church; it chimes the quarters, strikes the hours, has two dials, facing west and south, and is fitted with all modern improvements. Messrs. John Smith & Sons, of Derby, have carried out the work.

SURVEYS OF THE UNITED KINGDOM.—It is estimated that the expenses connected with the survey of the United Kingdom and of minor services connected therewith will amount, for the financial year just commenced, to about 266,000*l.* As a slight set-off it is anticipated that some 29,000*l.* will be received from the sale of maps to the public and for special work executed at the request of local and other authorities. The amounts to be devoted in the current year to the several sections of the work in hand, together with the further amounts that will probably be required, and the approximate dates proposed for the completion of some of the works are as under: Completion of the new series engraved 1-in. map with hills: amount required this year, 9,000*l.*; subsequently, 23,750*l.*; to be finished, December 31, 1902. Maintenance and revision of the 1-in. map of Great Britain: required this year, 2,000*l.* Special revision of the 1-in. map of Ireland: this year, 10,000*l.*; subsequently, 12,500*l.*; to be finished March 31, 1903. Special revision of the ½-in. map of England: this year, 1,500*l.*; subsequently, 1,500*l.*; to be finished March 31, 1901. Preparation of the engraved ½-in. map of Scotland: this year, 1,000*l.*; subsequently, 2,000*l.*; to be finished March 31, 1901. Special revision of the engraved $\frac{1}{10}$-in. map of Great Britain: this year, 300*l.*; subsequently, 1,700*l.*; to be finished March 31, 1902. General revision of the 6-in. and 25-in. maps of Great Britain so that no map shall have remained unrevised for a longer period than twenty years: this year, 105,787*l.*; subsequently to complete, 1,182,944*l.*; to be finished March 31, 1910. Completion of the re-survey of Ireland on the 25-in. scale: expenditure this year, 45,000*l.*; subsequently, 866,500*l.*; to be finished December 31, 1918. Publication of maps prepared and revised as above: this year, 47,100*l.*; subsequently, 757,300*l.*; to be finished, Great Britain, December 31, 1910; Ireland, December 31, 1920. Set of county maps showing existing Local Government areas: concluding expenditure, 750*l.*; to be finished March 31, 1900. Survey of Guernsey on the 25-in. scale (two-thirds of the cost of the survey to be repaid by the States and one-third out of the Crown revenues of the island): final expenditure, 533*l.*; date of completion, March 31, 1900. Maps for Land Judges' Court and Land Commission, Ireland (to be ultimately repaid from the proceeds of the sales of estates), 3,600*l.*; revision of town scale maps (the cost over and above the cost of revision on the 25-in. scale being repaid by the towns desiring revision on the larger scale), 5,000*l.*; engraving maps for the Geolo-

gical Survey, 1,000*l.*; and services for other public departments, 6,000*l.* It should be noted that maps and books are presented to libraries under the Copyright Act, and supplied gratuitously to public departments, &c. The value of the works so distributed in 1898 by the Survey Department was about 15,625*l.*

GLASGOW TECHNICAL COLLEGE. — The architectural classes of the Glasgow and West of Scotland Technical College had their annual Easter visit to Beverley and Hull. The party left Queen-street on the 1st inst. and returned on the Wednesday afternoon following. The principal object of the visit was to measure and sketch at Beverley Minster and St. Mary's Church, Beverley. The latter at the north end of the town is one of the largest parish churches in Yorkshire. It belongs to the Perpendicular period and contains some interesting old leaded glass. Beverley is almost unique among English towns in having, for its size, two such large mediæval churches. A visit was paid also to the interesting little church at Cottingham and the Holy Trinity Church at Hull. The amount of work done was a sufficient guarantee of the success of this holiday visit.

IPSWICH AND FELIXSTOWE BUILDING TRADES' ASSOCIATION.—The annual dinner of this Association was held recently at the Crown and Anchor Hotel, Ipswich, the chair being taken by Mr. Fred Grimwood, with Mr. Chas. Borrett in the vice-chair. On this occasion a general invitation had been extended to the architects and surveyors of the town and neighbourhood, which met with a hearty response, the professional body being represented by Mr. E. Buckham, C.E. (Borough Surveyor), Mr. H. Miller (County Surveyor), Mr. T. Miller, C.E., Mr. W. Eade, Mr. T. W. Cotman, Mr. G. W. Leighton, Mr. F. Crossley, and Mr. W. H. Brown. After the loyal and patriotic toasts, Mr. H. Miller submitted "The Town and Trade of Ipswich." Councillors F. Bennett, A. Ranson, and E. Catchpole responded. Mr. T. W. Cotman gave "Success to the Association." He remarked that he looked somewhat askance on trade combinations of any kind, but in the present state of affairs he recognised that they were called into existence for the purpose of mutual help and defence. It was, however, by individual effort and force of character that our commercial supremacy could be maintained, and he thought it a weak point in any trade when a person was coerced from making his own bargain when he liked, and with whom he liked. In acknowledging the toast, Mr. F. Grimwood remarked that it was only by such Associations that labour difficulties could be satisfactorily adjusted. They had no hostility to trade unions up to a certain point, but when the masters were not allowed to conduct their own business, it necessitated action being jointly taken by employers to protect interests, which, whilst not antagonistic to the men, were of vital importance to those who had put capital into concerns, and built up valuable trade connexions. He felt sure the architects must see the difficulties now surrounding the building trade, and so increasing cost of the work. Mr. Thurman also acknowledged the toast. The toast of "Past and Present Officers" was proposed by Mr. George Abbott, especial reference being made to the services of the hon. secretary (Mr. W. Grayston), who suitably replied. Mr. C. E. Whitmarsh gave "The Visitors." The Borough Surveyor responded, quoting statistics showing how steadily the town had grown since 1885. Since that year more than 3,000 dwelling-houses had been erected; 700 buildings other than dwellings had been built, and over 100 roads and streets made up. Councillor G. Fenn and Messrs. W. Eade and T. Miller, C.E., also replied.

CAPITAL AND LABOUR.

THE LABOURERS' STRIKE IN LEICESTER.—On the 6th inst. the number of builders' labourers on strike in Leicester had reached 751, and in addition there were sixty navvies and general labourers in receipt of strike pay. As was anticipated, this has brought building operations in the town and district practically to a standstill, throwing out of employment several hundred bricklayers and other building trade employés. It is stated that some twenty-six non-federated firms are now paying 6½d. an hour to the labourers, and this has been accepted by the men, whose notice was originally for an advance of a penny per hour. According to the employers' view, the difficulty is not really with the labourers, but with the plasterers, and it is suggested that whether the former had come out or not work must have been stopped until the plasterers' dispute was settled. The employers do not regard the later development as one of very serious importance, believing that matters will find their level when the plasterers resume work. That is not to be understood to mean that the desired advance, or any part of it, will be granted.

BRICKLAYERS' WAGES, COALVILLE, LEICESTERSHIRE.—The bricklayers at Coalville gave notice in November last for ½d. per hour advance, which the masters declined to give, but expressed their willingness for arbitration in the matter. The bricklayers, however, insisted on the advance, and determined to cease work on Good Friday, at the expiration of the notice. At a meeting of the master builders held subsequently, it was decided to concede the advance. The rate paid to bricklayers in the district will now be 8½d. per hour instead of 8d. as hitherto.

LANCASHIRE MASTER BUILDERS AND THE PLASTERERS' LOCKOUT.—According to an official report, the master builders are preparing for a general lockout of their men to bring the present plasterers' dispute to a settlement, and in this action are supported by the Engineering Employers' Federation. Over 200,000 men are affected.

STRIKE OF BUILDERS' LABOURERS AT GATESHEAD.—A large number of labourers employed by Gateshead builders are at present on strike for an advance in wages. The standard wage is stated to be 6d. per hour, but most of the smaller builders pay a halfpenny over this amount, and to the best class of workmen 7d. an hour is given. The workmen wish a minimum rate of 7d. to be paid to all labourers, and, this having been refused, they ceased work.

ARBROATH BUILDING TRADES DISPUTE. — The secretary of the Arbroath Joiners' Society on the 8th inst. received intimation that the federated masters had agreed to grant the increase of ½d. per hour for which the men had struck work, but that they declined to sign the by-laws in the meantime. The Committee of the Society met on Saturday evening, and it was unanimously resolved to continue the strike until the by-laws are signed. It is understood that the slaters employed in Arbroath have, following the suit of the painters and joiners, sent in a request for an increase of ½d. per hour.

LEGAL.

THE PUTNEY ANCIENT LIGHT DISPUTE.

THE case of Ayling & Sons *v.* Clements and Others came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Rigby and Vaughan Williams, on the 11th inst., on the appeal of the plaintiffs, Messrs. Edward Ayling & Sons, boat builders, of Putney, from a decision of Mr. Justice North in the Chancery Division refusing to grant an interim injunction restraining the defendants until the trial or further order from interfering with the plaintiffs' ancient lights, and also refusing to grant a mandatory injunction to compel the defendants to pull down so much of their building as had been erected since notice of the plaintiffs' claim to the ancient lights in question. The case was reported in the *Builder* of the 1st inst.

Mr. H. Terrell, Q.C., in opening the appellants' case, said that his clients' boathouse was originally built in 1859 by Messrs. Simmons, the boat builders, who then and for some time afterwards occupied it. In 1882 it was rebuilt and somewhat slightly altered. As the boathouse originally stood in 1859 there were three skylights on the western slope of the roof. In June, 1882, the premises were sold by Messrs. Simmons to a Mr. Alexander, who pulled down the boathouse and built the present one, but, although he altered the plane, he was careful to preserve the ancient lights in question.

The Master of the Rolls: Did Mr. Justice North refuse the injunction because the lights are not ancient?

Mr. Terrell: No, because the evidence was not sufficiently clear as to the identity of the lights.

The Master of the Rolls said it was a strange and unusual thing to ask for a mandatory order on an interlocutory application.

Mr. Terrell replied that the matter was a most important one to his clients, as the defendants had built up a wall and obscured their light altogether.

The Master of the Rolls: That is a case for "pulling down" after the trial, is it not?

Mr. Terrell said that the substantial question raised was one of law. His submission was that Mr. Justice North in holding that the plaintiffs must identify the lights exactly had gone wrong in law. He did not think that the facts were in dispute.

Mr. Cozens Hardy, who appeared for the defendants, Mr. Clements and Mr. Aldis, said that in his opinion the facts were directly in issue.

Mr. Terrell said that Mr. Justice North had overlooked the evidence of Mr. Simmons, who had worked for years under the old skylights. The Court of Appeal had held that although the plane was altered the ancient lights could be preserved.

Lord Justice Rigby said that the right to light might be lost if the owner of the dominant tenement had so altered his building that he could not identify the lights as they previously existed. There might be a question as to whether the lights had not been abandoned.

Mr. Terrell said that that was the point he had to meet.

Lord Justice Rigby said it appeared that neither the owner nor the architect nor any person on behalf of the owner took the slightest trouble to ascertain where the old windows were.

Mr. Terrell said that he would agree that they did not keep any records. The model which was in evidence showed that the second or middle of the plaintiff's three windows corresponded within an inch or two with the old window.

The Master of the Rolls asked Mr. Macnaghten, Q.C., who appeared for the defendant Hirst, the builder, whether he would give an underrtaking to "pull down" if ordered to do so at the hearing.

Mr. Macnaghten said he was of opinion that the plaintiffs had made out no case. The defendants' building was practically finished now. They began building as far back as October 1, and had been going on ever since.

Mr. Terrell said that the defendants had built 30 ft. higher since the writ was issued.

The Master of the Rolls: Well, the building looks practically up, as far as I can see.

Mr. Terrell: It is practically up now, but it was not so at the date of the writ.

The Master of the Rolls: An interlocutory injunction in such a matter as this is almost unheard of.

Mr. Terrell said that the plaintiffs had suffered great damage by what the defendants had done, which necessitated their using artificial light in their workshop. He, on behalf of the plaintiffs, was perfectly willing to treat the motion as the trial of the action. The whole question was whether the plaintiffs had preserved their lights or not.

The Master of the Rolls: Your lights are in such a case of ambiguity that we could not think of granting a mandatory injunction on such materials as these. It is hopeless.

Mr. Terrell pointed out that the plaintiffs might be seriously prejudiced if the defendants sold their property before the trial.

Mr. Macnaghten said that he was willing to have the trial expedited as far as possible.

After some further discussion it was arranged that the plaintiffs should register the suit as a *lis pendens*, and that the action should be set down at once for trial in the Chancery Division, with liberty to either party to apply.

The Master of the Rolls said that the appeal ought never to have been brought, and that it must be dismissed, with costs.

DECISION AS TO PICKETING.

IN the Chancery Division on Wednesday, Mr. Justice Stirling gave judgment in the case of Charnock *v.* Court and others. The action was brought by the plaintiff Charnock and twenty-five other master joiners of Halifax to restrain the defendants, two members of the strikers' union of joiners at Halifax, from watching or besetting the plaintiffs' premises, or interviewing their workmen with the object of inducing or persuading the men not to work for the plaintiffs. In February last a strike occurred among the joiners at Halifax, with the result that the plaintiffs had to seek for labour elsewhere. An agreement was entered into between the plaintiffs and certain workmen at Belfast, for these to come over by way of Fleetwood to fill the strikers' places at Halifax. The agreement was that the men, who described themselves as skilled workmen, and non-union men, should proceed to Halifax, and from February 21, 1899, work diligently and faithfully for a year for any firms of master-joiners of Halifax which should be specified. They were to be paid 8d. per hour, and were not to be employed for more than forty-nine and a half hours per week. The men came over from Belfast in two batches, the first consisting of nine, and the second of thirteen. On arrival at Fleetwood it was alleged that they were met at the landing-stage by certain members of the defendants' union, and induced or persuaded to break their contracts with the plaintiffs. The plaintiffs' case was that the defendants offered to pay the men's railway fares to whatever town, except Halifax, they desired to go for work. The result was that only six men arrived at the plaintiffs' works. The defendants, on the other hand, denied that they offered to pay the men's fares until they had made up their minds not to go to Halifax in consequence of the condition of things there. Any person or persons, said the Judge, who watched or beset a house or other place where such other person lived, or worked, or carried on business, or happened to be, with the object of inducing him not to work for his employers, was guilty of an illegal act. If, however, it was simply done with the view of gaining or communicating information it was a legal act, and the defendants were justified in their conduct. He was of opinion that what the defendants had done at Fleetwood, both at the landing stage and the railway station amounted to an illegal act, and therefore the plaintiffs were entitled to an injunction. As regarded what happened at Halifax when the men arrived there, there was a great conflict of evidence. The plaintiffs' case was that the men were interviewed at their lodgings, followed in the streets, and induced to go to the workmen's club, with the object of persuading them to leave the plaintiffs' employ and to seek work elsewhere. The defendants denied that there was any truth in that suggestion, and said that they only interviewed the men with the legitimate object of obtaining and communicating information. He came to the conclusion that it was not a case in which he ought to grant an interlocutory injunction, and therefore that portion of the plaintiffs' case failed. This point could only be decided at the trial. The case was of importance, and ought to be decided speedily. He would suggest at the assizes, where also the expenses incurred would be less. The judge then granted an injunction as to Fleetwood, or any other place where the men might be landed, as he had already intimated.

Judgment was given accordingly.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*New School of Science and Art	Frome U.D.C.	25l. and 10l.	April 29
*County Buildings, Edinburgh	Midlothian C.C.	.....	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Surveyor's Materials	Bermondsey Vestry	F. Summer, Surv. Town Hall, Spa-road, S.E.	April 17
Making-up King's-road	Reading Gas Co.	H. E. S. Baker, Engr. Gas Works, Reading	do.
Sewers, Comiston-road	Edinburgh T.C.	T. Hunter, City-chmbrs. Edinburgh	April 18
Stone (1,000 tons)	Witney (Oxon) R.D.C.	G. Wallis, Dist. Surv. Bampton, R.S.O. Oxon	do.
Cast Iron Pipes (400 tons)	Tynemouth T.C.	J. F. Smillie, Boro Surv. Tynemouth	do.
Wood Paving Blocks	Vestry of St. Mary Newington	L. J. Dunham, Vestry Hall, Walworth-rd. S.E.	do.
Footbridge, Plympton, Devon	G. W. Ry. Co.	G. K. Mills, Paddington Station, W.	do.
*Sluice Valve Hydrants	Tottenham U.D.C.	P. E. Murphy, 712, High-rd. Tottenham	do.
*Brick and Pipe Sewers	do.	do	do.
Cast Iron Pipes	Shrewsbury Gas Co.	W. Belton, C.E. Gas Works, Shrewsbury	April 19
Three Houses, Cliffe-lane, Hudders field	.....	J. Berry, Archt. 9, Queen-st. Huddersfield	do.
Two Cottages, Elgin, N.B.	.....	Reid & Wittet, Archt. Elgin	do.
House, Consett, Durham	J. Orton	G. T. Wilson, Archt. 121, Durham-rd. Blackhill	do.
Fire Station, Parkstone	Poole T.C.	J. Elford, Surv. Poole	do.
Church, Stenhousmuir	.....	J. Strang, 102, High-street, Falkirk	do.
House, Pennyburn, Londonderry	.....	W. E. Pinkerton, Archt. Londonderry	do.
Almshouses, Skeldergate, Yorks.	.....	Penty & Penty, Archt. Lewel-chmbrs. York	do.
Hall, Walton Workhouse	West Derby Union	H. P. Cleaver, Brougham-terrace, Liverpool	do.
Two Houses, William-st. Workington	W. R. Irvin	W. G. Scott & Co. Archt. Workington	do.
*Timber Goods Shed	Midland Railway	Co.'s Archt. Cavendish House, Derby	April 20
*Cleaning and Painting	do.	do.	do.
Flints	Warminster R.D.C.	R. H. Bourne, Surv. Crockerton, Warminster	do.
Road Materials	Selby R.D.C.	E. Townend, 1, Abbey-place, Selby	do.
Cottages, Wyringstown, co. Down	Lord Dunleath	H. Hobart, Archt. Dromore	do.
Whinstone (5,000 tons)	Rothwell nr. Leeds U.D.C.	J. T. Pears, Council Offices, Rothwell	do.
Hospital, Aspenden	Buntingford R.D.C.	E. G. Thody, High-street, Buntingford	do.
Electric Lighting Plant	Peterborough Corp.	J. C. Gill, C.E. Municipal Offices, Peterborough	do.
Additions to School, Kettins	.....	R. Watson, Coupar Angus, Fife	do.
Bridge, Aireworth	Keighley Corp.	W. H. Hopkinson, C.E. Town Hall	do.
Granite Setts (1,000 tons)	do.	do.	do.
Surveyor's Materials	Chorley (Lancs.) R.D.C.	J. Whitfield, 10, High-st. Chorley	do.
*Shop Premises with Dwelling House	Sunderland Union	E. F. Taylor, New Barnet	do.
*Electric Lighting	.....	W. & T. R. Milburn, 20, Fawcett-st Sunderland	April 21
Broken Granite Road Metal	Ashford U.D.C.	W. Terrill, Surv. North-st. Ashford, Kent	do.
Additions to Farm House, Richmond, Yorks.	.....	Clark & Moscrop, Archt. Darlington	do.
Store Premises and House, Silkstone	Barnsley Co-op. Soc.	G. Moxon, Archt. 24, Church-st. Barnsley	do.
Villas, Northfield-road, Dewsbury	.....	J. L. Fox, Archt. Bond-st. Dewsbury	do.
Making-up Whittaker-street	Batley T.C.	O. J. Kirby, Boro Surv. Market-place, Batley	April 22
Roads and Sewers, Cathays Park	Cardiff Corp.	W. Harpur, C.E. Town Hall	do.
Three Cottages, Bexhill	East Sussex C.C.	F. J. Wood, C.E. County Hall, Lewes	do.
Hospital, &c. Chinley, Chapel-en-le-Frith	High Peak Hospital Committee	W. R. Bryden, Archt. 1, George-st. Buxton	do.
House, Creevy, Crossgar	W. Hutton	F.W. Lockwood, Archt. 16 Waring-st. Belfast	do.
Warehouse, Leeds	Pilkington Bros.	T. Winn, Archt. 92, Albion-st. Leeds	April 23
*Isolation Hospital	Reigate T.C.	W. H. Prescott, Market Hall, Redhill	April 24
Sewers, &c.	Croston, nr. Preston U.D.C.	F. E. Dixon, C.E. 49, Lune-st. Preston	do.
Alterations, to House, Bourne, Lincs.	W. North	F. G. Shilcock, Archt. Bourne	do.
Street Works	Waterloo (Lancs.) U.D.C.	F. S. Yates, C.E. Town Hall	do.
House, Drumin, N.B.	.....	Mr. Thomson, Archt. Fife-Keith, N.B.	do.
Road Materials	Long Ashton R.D.C.	J. Hawkins, Surv. Brockley, Bristol	do.
Paving Clough-street	Morley Corp.	W. E. Putman, C.E. Town Hall, Morley	do.
Sewering, Victoria-rd. Morley	.....	do.	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered
Granite Road Metal (2,000 tons)	Runcorn R.D.C.	J. Ashton, Workhouse, Dutton, Runcorn	April 24
Chapel, Horbury	.....	W. H. Dinsley, Archt. Chorley, Lancs.	April 25
Firebricks, &c.	Tyldesley (Lancs.) Dist. Council	C. Austin, Council Offices, Tyldesley	do.
Alterations to Wingfield House, Trowbridge	Sir Vincent Caillard	W. H. Stanley, C.E Trowbridge	do.
Road Materials, nr. Guildford	Hambledon R.D.C.	G. Lintott, Surv Cranleigh	do.
Making-up Cobbold-road	Felixstowe U.D.C.	F. B. Jennings, Town Hall, Felixstowe	do.
*Enlarging School	Harrow (U.D.) S.B.	Houston & Houston, 5, York-bldgs. Adelphi, W.C	do.
*Post Office, Hyde, Manchester	Comrs. H.M. Works	Offices, Storey's Gate, Westminster	do.
*Taking-down and Rebuilding Walls	Hackney Union	W. A. Finch, 76, Finsbury-pavement, E.C.	April 26
*Iron Shelters, Walls, Gates, Fencing, &c.	Islington Vestry	J. P. Barber, Town Hall, Upper-st. N.	do.
Public Baths	Poole T.C.	J. Elford, Surv. Poole	do.
Club Premises, Crewe	.....	Sugden & Sons, Archt Leek	do.
*Materials (various)	Twickenham U.D.C.	F. W. Pearce, Town Hall, Twickenham	do.
Stations, &c.	Donegal Railway Co.	J. Barton, C.E. Exchange-buildings, Dundalk	do.
*Twenty-eight Artizans Dwellings	Brighton Corp.	F. J. C. May, Town Hall	April 27
Schools, Kelling	Weybourne (U.D.) Sch. Bd.	F. Andrews, Holt, Norfolk	do.
*Public Baths	Chester Corp.	Douglas & Minshull, Abbey sq. Chester	April 29
Police Station, Prudhoe	Northumberland C.C.	J. Cresswell, Moot Hall, Newcastle	do.
Road Works, Hellingly	East Sussex C.C.	F. J. Wood, Surv. Lewes	do.
Public Hall, Ynysbwl	.....	J. Rees, Archt Pentre	do.
*Name Plates	Ealing U.D.C.	C. Jones, Public Bldgs. Ealing	do.
*Yellow Deal Blocks	Paddington Vestry	Surveyor, Vestry Hall, Harrow-rd. W.	May 1
*Tar Paving Materials	L.C.C.	Parks Dept. 9, Spring-gardens, S.W.	do.
*Sewage Works	Mountain Ash U.D.C.	J. Mansergh, 5, Victoria-st. S.W.	do.
Four Houses, Lisburn, Ireland	H. G. Larimour	H. Hobart, Archt. Dromore co. Down	do.
*Structural Steel Work of Tower	Morecambe Tower Co. Ltd.	R. T. Gifford Read, 1, Gt Chapel-st. Westminster	do.
*Stables, Cottages, and Cells	County of Southampton	W. J. Taylor, The Castle, Winchester	do.
*Supply and Fixing Sanitary Appliances, &c. Darenth Asylum	Met. Asylums Bd.	Offices of Bd. Norfolk-st. Strand, W.C.	do.
*Filter Beds	Clacton U.D.C.	Taylor, Sons, & Santo Crimp, 27, Gt. George-st. S.W.	May 2
*Iron Pipe Sewers, Manholes, &c.	Watford U.D.C.	D. Waterhouse, 14, High-st. Watford	May 3
*Road Making and Paving	Fulham Vestry	C. Botterill, Town Hall, Walham Green, S.W.	do.
*Naval Reserve Buildings, Altcar, nr. Liverpool	Admiralty	Director of Works, 21, Northumberland-av. W.C	May 5
*School and Caretaker's House	Gloucester S.B.	A. J. Dunn, 31, St. Michael's-square, Gloucester	May 6
*Concrete Wall, Drainage, and other Work	Brecon C.C.	H. E. Thomas, County Hall, Brecon	do.
*Electric Light Station	Darlington Corp.	Boro. Surv.	May 8
*Railings, Gates, and Stonework and Steps	L.C.C.	Archt's. Dept. 13, Spring Gardens, S.W.	do.
*Superstructure of Band Stands and Painting	do.	do.	do.
*Lime	Richmond Main Sewerage Bd.	W. Fairley, C.E. Mortlake S.W.	May 9
Gasholder Tank, Great Float, near Birkenhead	Wallasey U.D.C.	J. H. Crowther, Engr. Great Float	May 15
*Seven Story Factory, Norwich	A. J. Caley & Son, Ld.	E. Boardman & Son, Queen-st. Norwich	No date
*Offices, Bristol	Prudential Insce. Co.	A. Waterhouse & Son, 20, New Cavendish-st. W.	do.
Shops, Walls-rd. Belfast	F. O'Neill	W. J. Moore, Archt. Belfast	do.
Four Houses, City-road, Chester	.....	T. M Lockwood & Sons, Archt. 80, Foregate-st. Chester	do.
House, Marine Parade, Clacton	G. W. Thomson	J. W. Martin, Archt. Station-chmbrs. Clacton	do.
School, Calstor	.....	J. H. Cooper, Archt. Lincoln	do.
Church, Barrow-in-Furness	.....	E. M. Young, Archt. 90, Duke-st. Barrow	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Engineer	Monmouth Corp.	.....	April 19
*Clerk of Works	Gloucester Corp.	3l. 3s. per week	April 24
*Clerk of Works	Limehouse B. of W.	2l. 10s. and uniform	do.
*Clerk of Works	Coventry Corp.	4l. per week	do.
*Architectural Assistant	L.C.C.	200l. per an. to commence	do.
*Works Manager	Cnty. Boro. of West Ham	500l. per annum	April 29
*Clerk of Works	County of Southampton	3l. per week and travelling expenses	No date

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv.* *Contracts, pp. iv. vi. viii. x. & xxii.* *Public Appointments, pp. xix. & xxii.*

MEETINGS.

FRIDAY, APRIL 14.

Architectural Association.—Mr. F. W. Pomeroy on "Modelling as Applied to Architecture," with practical demonstrations. 7.30 p.m.

Royal Institution.—Professor A. W. Rücker on "Earth Currents and Electric Traction." 9 p.m.

Institution of Junior Engineers (Westminster Palace Hotel).—Paper to be read and discussed: "Piles and Pile-driving," by Mr. H. C. Reid. 8 p.m.

SATURDAY, APRIL 15.

Institution of Junior Engineers.—Visit to the works of the new Vauxhall Bridge. 3 p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Beddington Sewage Farm. 3 p.m.

Perth Architectural Association.—Visit to Free Middle Church, Tay-street. 2.30 p.m.

MONDAY, APRIL 17.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. George Reid on "Sanitary Appliances." 8 p.m.

Victoria Institute.—Professor Hull, F.R.S., on "Sub-oceanic Terraces and River Valleys." 4.30 p.m.

TUESDAY, APRIL 18.

Society of Arts (Applied Art Section).—Mr. Stephen Webb on "Inlaying." 8 p.m.

Institution of Civil Engineers.—Mr. J. Murray Dobson on "Buenos Aires Harbour Works." 8 p.m.

WEDNESDAY, APRIL 19.

British Archæological Association.—Mr. C. Dack on "Survival of Old Customs at Peterborough." 8 p.m.

Society of Arts.—Mr. Walter Hunter, M.Inst.C.E., on "London's Water Supply." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Quarterly meeting of the members. 8 p.m.

Sanitary Institute (Demonstration for Sanitary Officers).—Inspection in the Parish of St. George's, Hanover-square. 2 p.m.

THURSDAY, APRIL 20.

Institution of Civil Engineers.—The seventh "James Forrest" Lecture, to be delivered by Professor J. A. Ewing: "Magnetism." 8 p.m.

Royal Institution.—Professor Dewar on "The Atmosphere." II. 3 p.m.

Society of Antiquaries.—8.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Wright Clarke on "Details of Plumbers' Work." 8 p.m.

FRIDAY, APRIL 21.

Institution of Civil Engineers.—The seventh James Forrest" Lecture, to be delivered by Professor J. A. Ewing: "Magnetism." 4 p.m.

Architectural Association.—Annual Soirée, St. George's Hall, Langham-place, W. A musical play will be performed, entitled: "The Druids' Elect: An Episode of the Ancient Britons." 8 p.m.

SATURDAY, APRIL 22.

Sanitary Institute (Demonstration for Sanitary Officers).—Inspection at the Sewage and Destructor Works, Ealing. 2.15 p.m.

Edinburgh Architectural Association.—Visit to Drum House.

RECENT PATENTS:

ACCEPTED SPECIFICATIONS.

Open to Opposition until June 6.

[1897.] 30,513, Jones, Vices, &c. 30,736, Silverman, Locks and Keys. [1898.] 2,716, McClurg & Miller, Gas Generators. 7,088, Morey, Fire or Burglar Alarm for Enclosed Places. 7,346. Crawford, Fireproof Floor for Buildings, &c. 7,540, Lock & Pashley, Ball and Socket Joints. 7,630, Sellars, Modelling Compositions or Compounds. 8,045, Zimmer & Others, Paints for Coating Iron and other Surfaces. 9,219, Colbran, Gas Lamps. 9,662, Snoeck, Burglar Alarms. 9,677, Veritys & Ebbutt, Swing Joints or Ceiling Connexions for Carrying Suspended Electrical Light Fittings. 9,934, Holden & Brooke, Plastic

Compositions for Decorating Walls, Ceilings, &c., in Relief. 10,236, Sandy, Bate, & Geer, Electrical Arc Lamps. 10,542, King & Pool, Folding Easel for Artists' Use. 10,577, Winterflood, Water Heaters and their Automatical Valve Attachments. 11,104, Pollock, Manufacture of Bricks, Tiles, &c. 11,412, Hebb & Squire, Circular Saw Benches. 11,566, Ely; 11,970, British Pure Acetylene Gas Syndicate and Keene; and 16,613, Testelin & Roseaux, Acetylene Gas. 11,803, Kuhnt and Deissler, Burners for Incandescent Oil Lamps. 12,078, Peter Wood, Limited, and Nash, Continuous Kilns for Burning Bricks, Tiles, Sanitary Ware, and other Clay Goods, and for Salt Glazing. 12,134, Alley, Pneumatic Hoists. 12,189, Crombie & Allen, Indented Wire Nails. 12,196, Hamblet, Sewer Blocks. 12,219, Smith, Hand Tools. 12,382, Hamer; and [1899] 2,367, Potter & Johnston, Lathe Chucks. 12,851, Adams, Brick Making Machine. 13,878, Ames, Earthenware and similar Pipes, and Method of Jointing them. 21,732, Jones, Door Springs and Swing-door Checks. 23,183, Sturge, Electrical Switches. 23,966, Gilbreth, Mixer for Concrete Cement and other substances. 25,638, McSweeney, Machine for Coating Paving Blocks, &c., with tar or other liquid or composition. 26,899, Weeks & Weeks, Pottery Moulding Machines. [1899.] 392, Antcliff, Hanging of Doors for Strong Rooms, Safes, &c. 2,209, Lundwall, Centrifugal Pumps. 2,382, Wolteréck, Manufacture of Pigments. 2,838, Landau, Method of Producing variously coloured objects of Marble-like or other ornamental appearance from Rubber and similar vulcanisable material. 3,286, Beard, Shore Groynes. 3,320, Rice, Automatical Dampers for Stove Pipes. 3,581, Eliot, Appliance for Kindling and Reviving Domestic and other Fires. 3,629, Nuttall & Cooper, Doors for Hoists. 4,165, Bouhon, Chimney and Ventilating Shaft Tops. 4,250, Streubel, Gas-cocks for Gas Burners. 4,328, Ebner, Parquetry and Wooden-block Flooring. 4,329, Strube, Doors. 4,342, Newell, Glass Tiles or Slabs for Architectural and similar uses. 4,472, Baumann & Baumann, Annular Kilns for Burning Bricks, &c.

ABSTRACTS OF PATENTED INVENTIONS.

28,320.—MANHOLE COVERS: *L. W. Lees.*—Radial slots are made in the cover, beneath which a dished plate, similarly slotted, is mounted upon a pivot, and can be rotated, for regulating ventilation, by means of a box-key which fits the pivot's upper end; a cover, kept in its place by pins that engage the slots, protects the pivot.

28,332.—TESTING AND DISINFECTING DRAINS: *B. H. Thwaite & H. Allen.*—For testing purposes a mixture of calcium carbide with a gelatinous or saccharine substance is sealed in glass tubes or fashioned in balls or tablets, and the acetylene gas that is given off upon contact with water will reveal the existence of a leak, whilst the resultant lime will act as a disinfectant.

28,338.—EXHAUSTING INCANDESCENT ELECTRICAL LAMPS: *F. J. Satchwell.*—When it strikes an electrical arc in a chamber through which the air in the lamp is drawn off, the residual oxygen in a lamp-bulb is converted into a highly-rarefied non-combustion supporting gas. The arc is made between two carbon terminals whereof one is flexibly supported, so that, being slightly tapped, they will separate, or the terminal can be made to slide through a mercury-sealed joint. Instead of the arc an incandescent carbon filament may be used.

28,384.—ATMOSPHERICAL GAS BURNERS: *Diamond Light Company.*—To prevent draughts and to ensure steadiness of the flames, two sets of air inlets are devised, one set being arranged out of alignment with the other set, and the air upon entering is partially divided by the shape of apertures in the outer sleeve or regulating contrivance. The burner tip and its ring or skeleton guide are mounted upon springs to prevent shocks and vibrations from reaching the mantle; coiled springs upon the guide rods carry the flange of the burner tip, and an angle-piece resting upon a ring supports the guide rods.

28,436.—SAFETY DEVICE FOR KITCHEN BOILERS: *J. Evans.*—A pipe, which must be efficiently protected from frost, is carried from near the bottom of the boiler to the open air at a point above the level of the cold water supply cistern.

28,439.—GENERATION OF ACETYLENE GAS: *V. Sockeel, A. Lauby, C. Drisse, and A. Sneck.*—The carbide is laid upon the perforated plate of the chamber which is placed inside a double bell, and a pipe, perforated and guarded with a cap at the top, passes down into the water beneath, the pressure of gas within the apparatus automatically controls the access of water to the carbide, and the gas passes through a pipe fitted with cocks to the outer bell, and thence by another pipe and purifier to the holder bell, the chamber is provided with a removable vessel for receiving the lime produced.

28,472.—SASH FASTENINGS: *W. Rankin.*—A locking-bar, which engages a catch, draws together and fastens the sashes, a spring-bolt on the bar engages a hole in the bar's pivot, and so locks the bar, the bolt can be screwed forwards by means of a milled head until the pin of a spring-knob enters into a groove in order to lock the bolt.

28,484.—A PAINT AND COATING: *H. Loesner.*—For a weatherproof and waterproof composition, varnish or drying oil is mixed with cement, or with a mixture of silica and cement, together with a pigment.

28,526.—MANUFACTURE AND MIXING OF GASES: *J. R. Wigham.*—To increase the illuminating power of coal or other gas supplied through a pipe, acetylene is added by passing the gas through a governor or delivering it at a uniform pressure to the burners, and introducing the acetylene, at a point between the governor and the burners, from a generator, a valve regulates the supply of acetylene, and has an index to show what amount of gas is needed for any desired increase of the illuminating power; a governor may be attached to the acetylene supply.

28,569.—LIFTING JACKS: *C. H. Slater.*—The operation is effected by means of a lever, held by a link, in the end of which a pin engages with a rack-bar mounted in guide-standards, and kept in position by a spring-pawl; a set-screw secures a pillar, having an adjustable head, to a foot of the rack's lower end.

28,618.—WOODEN FIXING BLOCKS OR BRICKS: *G. Connell.*—Wooden facing-strips are secured to bricks, concrete, &c., by means of bolts, interlocking dove-tailed projections, recesses, and wedges, flat-headed nails, or metal strips embedded in the concrete and nailed to the wooden face; to the faces of the blocks when built or secured in position, mouldings, wall-linings, and boards may be conveniently nailed.

28,620.—IMPREGNATION OF WOOD, BRICKS, STONE, &c.: *H. Higgins.*—Porous materials are first heated by superheated steam and then immersed in solutions, for which crystalloid salts are used; for the precipitation of insoluble silicates in the pores an alkaline silicate and a soluble substance—*e.g.*, calcium chloride—are separately introduced.

28,636.—MOULDING TILES: *W. & J. Burton.*—Inclined teeth or plates that slide in slots cut in the bottom die or plunger form recesses in the tile, when the plunger is raised in order to eject the tile from the mould, springs force the teeth backwards and the teeth are again raised for action by the contact of their lower ends with a bed plate when the plunger is lowered.

28,656.—BLOCKS FOR PAVING ROADS, PATHS, &c.: *W. H. Northcutt.*—The blocks are made of cement, cast in a mould formed with grooves in its hinged sides, or of cast or pressed metal, fashioned with treads and tongues upon two adjacent sides and corresponding grooves upon the remaining sides, and the grooves are filled with mortar, cement, &c., to be kept in position by the metal shell and the ribs and flanges formed with it. Gutter and kerb blocks are similarly formed; curved blocks may be used for arching over tunnels and large sewers, and wood blocks interlocked by means of their tongues and grooves, will serve for paving purposes.

28,696-7.—WINDOWS AND PRISM-PLATES: *J. M. Ewen.* Prism plates are arranged in an inclined frame, so that the middle prisms direct the light into the middle of the room whilst the side prisms project the light obliquely on to the sides of the room, the frame can be attached to the top of the window frame, or it can be placed vertically in the window's front; transparent plates or tiles for windows, vault-lights, and so on, are made in curved, lenticular, ribbed, or corrugated shapes, and have parallel prisms upon one side which will throw the light in the direction desired.

28,726-8.—HOLDERS FOR INCANDESCENT ELECTRICAL LAMPS: *J. Booth.*—By one contrivance the casing is made in two parts, whereof one has an outside screw for a cord grip, two inside projections to prevent the insulator from rotating, and a flange; the other part is attached to the former within the flange, and is screw-threaded upon its expanded portion for carrying a ring that holds the shade. In another form the casing is made in one piece by stamping. By another contrivance the insulating body, made in one piece, is cylindrical in shape, and has an enlarged part; a projection extends diametrically across one end of the insulator, having on each side round holes which receive contact-blocks and plunger-holders, stepped to fit together, and secured by screws.

28,823.—DOORS AND FRAMES FOR MANHOLES AND GRATINGS: *J. Price & J. Johnson.*—A spanner-shaped lever, pivotted to a lug and engaging with a projection, holds down the cover or grating of the manhole, or service-box, or electrical junction-box, &c.; the cover is unlocked and raised by passing a hook down to engage with the lever's free end, and a nose of the lever acts a fulcrum for the starting of the cover by the lever, a wedge, pivotted to the lever, and inserted between the back and the frame, serves to hold the grating or cover when it is lifted up.

28,842.—ARTIFICIAL STONE, CEMENT, &c.: *H. W. Gruner.*—With calcined magnesia are mixed certain filling materials, such as sand, sawdust, burned refuse, ashes, powdered cork waste, powdered marble or granite waste, and to the admixture is added a solution of magnesium chloride, acetic acid, zinc sulphate, and an alcoholic solution of isinglass soap. The material, which the inventor claims to be capable of resisting acids and fire, can be used as cement or artificial stone, may be moulded into bricks, tiles, or slabs, and utilised for baths, cisterns, floors, ceilings, roofing tiles, paving, walls, and similar things. Slabs, separated by layers of moss-litter, &c., can be used for building soundproof walls, and a substitute for linoleum is to be prepared by adding cork powder to the magnesia and solution.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

March 17.—By WILLIAM SNOWDON (at Easingwold).

Farlington, Yorks.—Wandmore Farm, 55 a. 2 r. 1 p., f. £1,375

March 25.—By R. MARSH & SON (at Newcastle).

Tanfield, Durham.—Waggon Hill Farm, 46 a., f. ... 2,005
Mounsett Cottage, f. 210

March 28.—By R. DONKIN & SON (at Newcastle).

Whalton, Northumberland.—East Low House Farm, 108 a. 1 r. 25 p., f. 3,350
Beanley Farm, 86 a. 0 r. 22 p., f. 4,300
The Mansion House and 22 a. 0 r. 38 p., f. 2,715
The Home Farm, 37 a. 3 r. 38 p., f. 1,750
Bondicar Farm, 114 a. 1 r. 12 p., f. 3,000

March 29.—By STEPHENSON & ALEXANDER (at Pontypridd).

Pontypridd, Glamorgam.—F.g.r.'s 458*l.* 15*s.* 2*d.*, on the Newbridge Estate, reversions ranging from 25 to 78 yrs. (in lots) 14,375
Enclosures of land, 7 a. 3 r. 8 p., f. 315
Llantwit Vardre, Glamorgan.—Glanmyddlin Farm, 20 a. 0 r. 15 p., f. (including minerals) 1,200

By H. E. ARCHER (at Saxmundham).

Peasenhall, Suffolk.—The Chalet and The Street Grove Farm, 46 a. 2 r. 18 p., f. and c. 1,480
A freehold cottage and 1 a. 0 r. 36 p. 160

By JOHN CHAMBERS (at Wargrave).

Wargrave, Berks.—Twyford-rd., a freehold house. 800
Highfield-rd., Hyems and Pig Pightle enclosures, 17 a. 2 r. 22 p., f. 1,100
Blake's-rd., Royal Hill enclosure, 17 a. 1 r. 3 p., f. 1,300

April 6.—By BOWDITCH & GRANT.

Sydenham.—54, Wells-rd., u.t. 66½ yrs., g.r. 3*l.*, r. 35*l.* 400
Croydon.—18 and 19, Amberley-grove, f., r. 62*l.* ... 800

By CHARLES HALL.

Camden Town.—3, 5, and 7, Bayham-st., u.t. 11¼ yrs., g.r. 54*l.* 245
Paddington.—44, Eastbourne-ter., u.t. 40 yrs., g.r. 12*l.*, e.r. 100*l.* 800

By IZARD, FRENCH, & IZARD.

Notting Hill.—Arundel-gardens, freehold rent charges of 19*l.* 10*s.* 300
Rotherhithe.—Church-st., St. Mary's Warehouse or Granary, f., r. 40*l.* 460

By HAWKINS & EDGECOMBE.

Brixton.—204, 208, 210, 222 to 230 (even), Lyham-rd., f. 2,120

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G.	ton	£8	0	0	0	0 0
Teak, E.I.	load	11	15	0	16	15 0
Sequoia, U.S., ft. cube		1	9	0	2	0 0
Ash, Canada, load		4	0	0	5	5 0
Birch, do		3	10	0	5	10 0
Elm, do		4	12	6	5	15 0
Fir, Dantsic, &c.		1	10	0	3	10 0
Oak, do		3	5	0	4	0 0
Canada		4	10	0	6	5 0
Pine, Canada red		0	0	0	0	0 0
Do, yellow		4	7	6	6	5 0
Lath, Dantsic, fathom		4	10	0	5	10 0
St. Petersburg		4	0	0	6	10 0
Wainscot, Riga, &c., log		3	15	0	6	5 0
Odessa, crown		3	15	0	6	5 0
Deals, Finland, 2nd and 1st std. 100		9	15	0	10	5 0
Do., 4th and 3rd		9	15	0	10	5 0
Do., Riga		8	5	0	9	5 0
St. Petersburg, 1st yellow		11	15	0	14	5 0
Do., 2nd yellow		10	15	0	12	5 0
Do., white		9	15	0	11	15 0
Swedish		9	15	0	16	15 0
White Sea		10	15	0	18	0 0
Canada Pine, 1st		18	15	0	25	5 0
Do., do., 2nd		13	15	0	17	0 0
Do., do., 3rd, &c.		6	15	0	10	0 0
Do. Spruce, 1st		8	5	0	10	5 0
Do., do., 3rd and 2nd		7	0	0	8	5 0
New Brunswick		7	0	0	7	15 0
Battens, all kinds		5	0	0	16	0 0
Flooring boards, sq., 1 in., prep., 1st		0	12	0	0	15 3
Do., 2nd		0	10	6	0	12 3
Other qualities		0	5	3	0	6 6
Cedar, Cuba, ft.		0	0	4	0	0 4½
Honduras, &c.		0	0	4	0	0 4½
Mahogany, Cuba		0	0	5½	0	0 7½
St. Domingo, cargo av.		0	0	5	0	1 3
Mexican do., do.		0	0	3½	0	0 4
Tabasco, do., do		0	0	4	0	0 6½
Honduras, do.		0	0	4½	0	0 6
Box, Turkey, ton		6	0	0	15	0 0
Rose, Rio		7	0	0	16	0 0
Bahia		6	0	0	14	0 0
Satin, St. Domingo, ft.		0	0	6	0	1 0
Porto Rico		0	0	9	0	2 0
Walnut, Italian		0	0	3	0	0 7½

METALS.

IRON—Pig, in Scotland	ton	2	14	2½	0	0 0
Bar, Welsh, in London		6	0	0	6	5 0
Do. do. at works in Wales		5	15	0	5	17 6
Do. Staffordshire, in London		6	5	0	7	10 0
COPPER—British cake and ingot		75	15	0	0	0 0
Best selected		76	5	0	76	15 0
Sheets, strong		79	0	0	81	0 0
Chili bars		71	7	6	0	0 0
YELLOW METAL	lb.		6½d.			7d.
LEAD—Pig						
Spanish	ton	14	10	0	0	0 0
English Com. Brands		14	15	0	0	0 0
Sheet, English, 6 lbs. per sq. ft. and upwards		15	15	0	0	0 0
Pipe		16	5	0	0	0 0
ZINC—English sheet	ton	30	0	0	0	0 0
Vieille Montagne		31	0	0	0	0 0
Spelter		27	17	6	28	0 0
TIN—Straits		113	7	6	0	0 0
Australian		113	10	0	114	0 0
English Ingots		116	0	0	117	0 0
Banca		114	0	0	0	0 0
Billiton		113	0	0	0	0 0

OILS.

Linseed	ton	17	15	0	0	0 0
Cocoanut, Cochin		29	10	0	0	0 0
Do. Ceylon		25	15	0	0	0 0
Palm, Lagos		24	10	0	0	0 0
Rapeseed, English, pale		22	15	0	0	0 0
Do. Brown		21	5	0	0	0 0
Cottonseed ref.		16	10	0	17	0 0
Oleine		17	0	0	19	0 0
Lubricating U.S.		0	5	3	0	7 6
Do. Black		0	5	0	0	6 6
TAR—Stockholm	barrel	1	6	6	0	0 0
Archangel		0	18	0	0	0 0
Turpentine		33	0	0	33	5 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDARE.—For the erection of seventeen houses, Cwmaman, Aberdare. Mr. J. Llewellin Smith, architect, Aberdare:—

Morgan & Sons (per house)	£182 10	Willis, Ystrad (per house)*	£162 10

[*See also next page.*

BOURNEMOUTH.—For constructing sewers through the Upper Gardens from manhole opposite the "London Hotel" to the borough boundary, and other works in connexion therewith. Mr. F. W. Lacey, Borough Engineer and Surveyor :—

F. Osman	£10,050	Cooke & Co., 16, Victoria-st., S.W.*	£10,000
Grounds & Newton (informal)	10,402		

BRIXHAM.—For alterations, reseating, and renovations at the Wesleyan Chapel, Brixham. Mr. W. G. Couldrey, architect, Paignton. Quantities by Mr. Vincent Cattermole Brown, Paignton :—

H. Pharo	£1,490 0	R. Waycott	£893 0
E. Pike	935 0	R. F. Yeo, Torquay*	889 0
W. Smaridge	898 10		

DOVER.—For the erection of the superstructure of new branch premises at Cherry Tree-avenue, Dover, for the River and District Co-operative Society, Limited. Mr. A. H. Steele, architect, Folkestone-road, Dover. Quantities by the architect :—

Keeler	£4,204 5	Lewis & Sons	£3,500 0
W. G. Lewis	3,966 0	Dawkins, Dover*	3,222 0
Denne	3,796 0	Hall	3,045 10

HIGHAM FERRERS, Northants.—For the erection of three houses, for Mr. W. Spong. Mr. H. Adnitt, architect, High-street, Rushden. Quantities by the architect :—

C. E. Bayes	£765 0	H. Sparrow	£744 0
F. Henson	763 0	R. Marriott	724 0
T. Wilmott	759 0	E. Mitchell	720 10
J. Harrison	750 0	Whittington & Tomlin, Rushden*	720 0
T. Swindall	746 0	T. & C. Berrell	699 0
Hacksley Bros.	745 0		

HIGHAM FERRERS.—For the erection of three houses for the Freehold Land Society. Mr. H. Adnitt, architect, High-street, Rushden. Quantities by the architect :—

T. Wilmott	£768 10	E. Mitchell	£724 0
A. Trayner	748 15	Hacksley Bros.	724 0
H. Sparrow	730 10	F. Henson	720 0
Whittington & Tomlin	730 0	T. & C. Berrell	710 0
R. Marriott	725 0	Swindall, Rushden*	691 0

HITCHIN.—For erecting six cottages at Hitchin for the trustees of the Odd Fellows' Club. Mr. J. Shilcock, architect :—

Ruffield	£1,490	S. Redhouse	£1,220
Meridew & Wort.	1,485	F. Newton*	1,196
Dennis	1,399	M. Foster	1,195
Wilmott Bros.	1,352		

LEYTON.—For the erection of billiard-room, concert hall, and lavatories, Progressive Club, Pioneer Lodge, Church-road, Leyton, Essex :—

H. Wood* £1,525

LONDON.—For the erection of seven houses in The Avenue, Bruce-grove, for Mr. H. Moore. Mr. E. Howard, architect :—

W. Hawley, Tottenham* £2,275

LONDON.—For reconstructing twenty-eight gas retorts, for the Darenth Asylum (tenders from three selected firms), for the Metropolitan Asylums Board :—

Leeds Fireclay Co., Limited	£1,425	J. Drake & Son, Ovenden, Halifax*	£1,290
R. & J. Dempster	1,325		

LONDON.—For water mains and out-side hydrants, South-Western Hospital, for the Metropolitan Asylums Board. Mr. Thomas Kirkland, architect :—

Merryweather & Sons, Lim.	£850 0 0	J. & F. May	£663 0 0
Moorgate Engineering Co.	765 0 0	Heyworth & Co.	647 15 2
F. S. Courtney	735 15 0	Shand, Mason, & Co., 75, Upper Ground-street, S.E.*	534 18 0
Bentham & Co.	724 0 0		

[Architect's estimate, £490.]

LONDON.—For new coroner's court, mortuaries, shelters, &c., High-street, Poplar, E., for the Board of Works for the Poplar District. Messrs. Lansdell & Harrison, architects, 38, Bow-lane, E.C. Quantities by Mr. Jno. R. Hunt, Bridge House, 181, Queen Victoria-street, E.C. :—

A. E. Symes	£8,575	Godfrey & Son	£7,942
Gregory & Co.	8,137	Spencer, Santo, & Co.	7,796
The General Builders, Limited	8,000	L. H. & R. Roberts	6,946
		W. Norton	6,764

WESTGATE-ON-SEA.—For the erection of a private residence for Mr. F. Seaton. Mr. Delissa Joseph, architect, 17, Basinghall-street, E.C. Quantities by Mr. F. Taperell :—

Paramor & Sons	£4,920	A. Dyke	£4 189
A. Wing	4,454	G. H. Pettman, Birchington*	4,166
T. T. Denne	4,195		

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder," by *Friday Morning's Post.*

THE BATH STONE FIRMS, Ltd.
BATH
FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(incorporating The Ham Hill Stone Co. and C. Trask & Son, The Doulting Stone Co.)
Chief Office :—Norton, Stoke-under-Ham, Somerset.
London Agent :—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co. [ADVT.

THE TEST OF TIME
has proved that
SZERELMEY STONE LIQUID
Absolutely waterproofs and preserves Bricks, Stone, Cement, Stucco, Plaster, &c.
SZERELMEY & CO.,
ROTHERHITHE NEW-ROAD, S.E.

SPRAGUE & CO., Ltd.,
LITHOGRAPHERS,
Employ a large and efficient Staff especially for Bills of Quantities, &c.
4 & 5, East Harding-st., Fetter-lane, E.C. [ADVT.

QUANTITIES, &c., LITHOGRAPHED
accurately and with despatch.
METCHIM & SON { 8, PRINCES STREET, ST. GEORGE ST. WESTMINSTER
"QUANTITY SURVEYORS' DIARY AND TABLES," For 1899, price 6d. post 7d. In leather 1/- Post 1/1 [ADVT.

J. J. ETRIDGE, Jr.
SLATE MERCHANT,
SLATER and TILER.
ESTIMATES GIVEN FOR
SLATING AND TILING,
To be executed by Contract in any part of ENGLAND.
Penrhyn - Bangor,
Oakeley - Portmadoc,
And other description of Slates Ready for immediate delivery to any Railway Station.
Applications for Prices, &c., to
BETHNAL GREEN SLATE WORKS,
BETHNAL GREEN, LONDON, E.

ASPHALTE
For Horizontal & Vertical Damp Courses.
For Flat Roofs, Basements, & other Floors.
Special attention is given to the above by
THE
French Asphalte Co.
Contractors to
H.M. Office of Works, The School Board for London, &c.
For estimates, quotations, and all information, apply at the Offices of the Company,
5, LAURENCE POUNTNEY HILL,
CANNON STREET, E.C.

C. B. N. SNEWIN
MAHOGANY, WAINSCOT, WALNUT,
TEAK, VENEER, and TIMBER MERCHANT
Nos. 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, & 17, BACK HILL, HATTON GARDEN, and 29, RAY STREET, FARRINGDON ROAD, E.C.
THE LARGEST STOCK OF ALL KINDS OF WOODS IN EVERY THICKNESS, DRY, AND FIT FOR IMMEDIATE USE.
Telephone, No. 274 Holborn. Tels. Address "SNEWIN: London."

TWELVE GOLD AND SILVER MEDALS AWARDED.
IRON CISTERNS.
F. BRABY & CO.
VERY PROMPT SUPPLY.
LARGE STOCK READY.
Particulars on application. **CYLINDERS FOR HOT-WATER CIRCULATION.**
LONDON: 352 to 364, EUSTON-ROAD, N.W., and 218 and 220, HIGH-STREET, BOROUGH, S.E.
LIVERPOOL: 6 and 8, HATTON GARDEN.
GLASGOW: 47 and 49, ST. ENOCH-SQUARE.
BRISTOL: ASHTON GATE WORKS, CORONATION-RD.

TREGGON & CO.

ZINC ROOFERS

COPPER ROOFERS

IRON ROOFERS

Enquiries Invited from Town and Country.

TREGGON & CO.

Zinc, Iron, Felt, and Cistern Merchants and Manufacturers, and Contractors for

COPPER, IRON, and **ZINC ROOFING,**

FIXED COMPLETE.

(THE OLDEST FIRM IN THE TRADE.)

YORK WORKS, BREWERY ROAD, LONDON, N.

Telegrams: "TREGGON, LONDON."

W. SUMNER & CO. LTD.

Diana Place, 388, Euston Road,

HIGH-CLASS STEAM JOINERY WORKS

ESTIMATES QUOTED FOR EVERY DESCRIPTION OF JOINERY FOR ARCHITECTS, BUILDERS, AND THE TRADE.

Fittings for Banks, Offices, Churches, Shops, &c.

Telephone No. 760, King's Cross. Telegrams "Renovation," London.

HITCHINS' PATENT MACHINE-MADE FIBROUS PLASTER SLABS.

FIXED WITH NAILS WITHOUT BORING.

10,000 SEASONED SLABS ALWAYS IN STOCK.

PRICE 1½d. PER FOOT SUPER.

THE VENTURA SYNDICATE, LTD.,

WEST BANK, BARKING, E.

WILLESDEN PAPER.

2-Ply for **Underlining** Slates, Tiles, Iron Buildings, with or without Boards. | **1-Ply** for **Laying on Joists** under Floor Boards to Deaden Sound, &c.

WATER-PROOF. ROT-PROOF. INSECT-PROOF.

Lists and views of large contracts where Willesden Paper has been used, and Catalogues and Samples, Post Free.

WILLESDEN PAPER AND CANVAS WORKS, WILLESDEN JUNC. LONDON, N.W.

PATENT DAMP-COURSE & MASTIC FLEXIBLE ROOFING FELT.

SUPERIOR QUALITY. REQUIRES NO TARRING.

Our Damp-course is Manufactured in 32-ft. length, being an improvement over the old system of 32 inches. Saves 25 to 30 per cent. in material and labour.

Manufactured by **L. LEWIS & CO.** (late S. Frankenberg & Co.)

Offices: 51, SHIRLAND-RD. Paddington, W. Wharves: 8, AMBERLEY-RD. Paddington, W.

WHOLESALE AND EXPORT. SAMPLES FREE ON APPLICATION.

GEARY, WALKER, & Co.

PARQUET MOSAIC & WOOD-BLOCK FLOORS.

11. QUEEN VICTORIA STREET, LONDON. E. C.

Dennett Fireproof Floors, &c.

CONSTRUCTIVE IRONWORK OF ALL DESCRIPTIONS.

DESIGNS AND ESTIMATES SUPPLIED TO ARCHITECTS.

FIREPROOF ENCASEMENT OF IRONWORK.

CONCRETE STAIRS, PAVING, &c.

Apply to DENNETT & INGLE { *No. 24, QUEEN ANNE'S GATE* (late No. 5, WHITEHALL), } *LONDON, S.W.*

SPECIAL ADVANTAGES TO PRIVATE INSURERS.

THE IMPERIAL Insurance Company, Limited. FIRE. (Est. 1803), 1, Old Broad-street, E.C. and 22, Pall Mall, S.W.

Subscribed Capital, 1,200,000*l.* Paid-up, 300,000*l.* Total Funds, over 1,500,000*l.*—E. COZENS SMITH, General Manager.

PHŒNIX FIRE OFFICE,
19, LOMBARD STREET,
AND
57, CHARING CROSS, LONDON.
ESTABLISHED 1781.

LOWEST CURRENT RATES.
LIBERAL AND PROMPT SETTLEMENTS.
ASSURED FREE OF ALL LIABILITY.
ELECTRIC LIGHTING RULES SUPPLIED.

W. C. MACDONALD } Joint
F. B. MACDONALD } Secretaries.

THE VULCAN
BOILER AND GENERAL
INSURANCE CO.,
LIMITED.
(Late The Boiler Insurance and Steam Power Co., Lim. The Original Boiler Insurance Company.)
Head Office: 67, King Street, Manchester.
ESTABLISHED 1859.
Subscribed Capital - - £375,000.
Boilers and Engines Insured and Inspected.
Rates quoted to meet the
WORKMEN'S COMPENSATION ACT,
Employer's Liability Act, and Common Law.
Individual Accident Insurance.
Upwards of 40,000 Boilers & Engines under supervision.

J. F. L. CROSLAND, M.Inst.C.E., M.Inst.M.E., Chief Engineer.
EDWARD HADFIELD, Secretary.
Application for Agencies Invited.

The Surveyors' Districts Map
— OF THE —
County of London
(Supplement to the NEW YEAR'S NUMBER), can be
MOUNTED ON CLOTH,
If sent to the Publishing Office, at the following PREPAID rates, viz. :—

ON STRAINER (Varnished)	5/-
ON ROLLERS do.	3/6
FOLDED, in Case (Unvarnished)	2/6

N.B.—A remittance MUST accompany every Map sent in for mounting.

The NEW YEAR'S NUMBER is OUT OF PRINT, but
REPRINTS OF THE MAP ARE NOW READY,
Price One Shilling,
which purchasers can have mounted at above-mentioned prices.

Office :—45, CATHERINE STREET, LONDON, W.C.

THE ABBEYS OF GREAT BRITAIN.
In each case—VIEW, specially drawn for this series. GROUND PLAN, to a large scale, shaded to indicate the date and style of the several parts; DESCRIPTIVE ARTICLE, &c.

1894.		1895.	
1. Westminster	JAN.	8. Fountains	JAN.
2. Rievaulx	JULY.	9. Tynemouth	FEB.
3. Glastonbury	AUG.	10. Malmesbury	MARCH.
4. Croyland	SEPT.	11. Netley	APRIL.
5. Whitby	OCT.	12. Bolton	MAY.
6. Bath	NOV.	13. Lindisfarne	JUNE.
7. Tewkesbury	DEC.	14. Furness	JULY.
		15. Romsey	OCT.
1896.		1897.	
16. Kirkstall	JAN.	20. Great Malvern	JAN.
17. Abbey Dore	APRIL.	21. Sherborne	APRIL
18. Selby	JULY.	22. Bayham	JULY
19. Byland	OCT.	23. Pershore (out of print).	
1898.		1899.	
24. Melrose. (out of print).		28. Llanthony (out of print).	
25. Waltham	APRIL.	29. Hexham	APRIL
26. Tintern	JULY.	30. Valle Crucis	JULY
27. Lanercost	OCT.	31. Cartmel	OCT.

Post-free FOURPENCE-HALFPENNY each.

THE REREDOS, ST. PAUL'S
(15in. by 11½in.), on stout paper, for framing, 6d.; by post, 9d.

PORTFOLIOS
for Preserving the Plates unfolded, 2s. 6d.; by post, 3s.

London: The Publisher of "THE BUILDER," 46, Catherine-street, W.C.

BILLS OF QUANTITIES, &c.
LITHOGRAPHED CORRECTLY BY RETURN OF POST. A LIBERAL DISCOUNT OFF USUAL PRICES.
PLANS BEST STYLE.
ALLDAY, LIMITED.
Shakespeare Press, Birmingham.

RIVINGTON'S COURSE OF BUILDING CONSTRUCTION.
NOTES ON BUILDING CONSTRUCTION.
Arranged to meet the requirements of the Syllabus of the Science and Art Department of the Committee of Council on Education, South Kensington. Medium 8vo.
Part I.—ELEMENTARY STAGE. With 552 Illustrations. 10s. 6d.
Part II.—ADVANCED STAGE. With 479 Illustrations. 10s. 6d.
Part III.—MATERIALS. Course for Honours. With 188 Illustrations. 21s.
Part IV.—CALCULATIONS FOR BUILDING STRUCTURES. Course for Honours. With 597 Illustrations. 15s.
LONGMANS, GREEN, & CO., LONDON, NEW YORK, and BOMBAY.

THE "BUILDER" CATHEDRAL SERIES
ENGLAND AND WALES.
In each case—EXTERIOR VIEW, specially drawn for this series, GROUND PLAN, to a large scale, shaded to indicate the date and style of the several parts; DESCRIPTIVE ARTICLE, with sketches of details, &c.

*1. Canterbury	9. Norwich	17. Llandaff	24. Truro
*2. Lichfield	10. Rochester	18. Oxford	25. St. David's
*3. St. Alban's	*11. Lincoln	19. Southwell	*26. York
*4. Peterboro'	*12. Gloucester	20. Worcester	*27. Ripon
*5. Wells	13. St. Paul's	21. Bangor and 22. St. Asaph	*28. Chester
*6. Exeter	14. Hereford		29. Manchester
*7. Salisbury	*15. Chichester		30. Carlisle
8. Bristol	*16. Ely	*23. Winchester	*31. Durham

*Post-free FOURPENCE-HALFPENNY each, except 1, 2, 3, 4, 5, 6, 7, 11, 12, 15, 16, 23, 26, 27, 28, and 31, the numbers of "THE BUILDER" containing these being OUT OF PRINT; but reprints of the VIEW, PLAN, AND DESCRIPTION OF CANTERBURY, LICHFIELD, ST. ALBAN'S, PETERBOROUGH, WELLS, EXETER, SALISBURY, GLOUCESTER, CHICHESTER, WINCHESTER, YORK, RIPON, CHESTER, and DURHAM, can be had, price 1s. each. Postage and packing of reprints extra; single sets, 2d. or the fourteen sets together, 9d.
☞ The whole series (excepting Nos. 11 & 16, which are now quite out of print, but including reprints as above) 18s. 8d.; post-free, 20s.

SCOTLAND.

1. Glasgow	4. Kirkwall	6. Dunblane	8. St. Andrews
2. Edinburgh	5. Iona	7. Dunkeld	9. Brechin
3. Aberdeen			10. Elgin

Price 4½d. each, or the complete Series 3s. 4d. post-free.

IRELAND.
1. St. Patrick | 2. Christchurch | 3. Kilkenny.
Price 4½d. each, or the complete Series, 1s. 1d. post-free.

London: Publisher of "THE BUILDER," 46, Catherine-street, W.C.

THE ARCHITECTURE OF
OUR LARGE PROVINCIAL TOWNS.
"THE BUILDER" SERIES.

1896.
1. Liverpool ..Sep. 26 | 2. Manchester Nov. 7 | 3. Leeds.....Dec. 19

1897.
4. Bristol ....Jan. 30 | 7. Leicester ..June 5 | 10. Sheffield .. Oct. 9
5. Cardiff ....Mar. 13 | 8. Derby ....July 17 | 11. Birmingham Nov 27
6. Northampton Apl 24 | 9. Nottingham Aug 28

1898.
*12. Edinburgh Jan. 1 | *15. Aberdeen May 14 | 18. Nwcstle-on-T. Oct 8
13. Bradford..Feb. 19 | 16. Glasgow.. July 9 | 19. Belfast.... Nov. 19
14. Hull .....Apl. 2 | 17. Dundee ..Aug. 13

1899.
*20. Dublin (the last of the series) Jan. 7.
*Nos. 12 (Edinburgh), 15 (Aberdeen), and 20 (Dublin) are *out of print*.

Post-free FOURPENCE-HALFPENNY each.

London: The Publisher of "THE BUILDER," 46, Catherine-street, W.C.

"The Builder" Student's Series.
Crown 8vo, 3s. 6d. post free.
SPECIFICATIONS FOR BUILDING WORKS, AND HOW TO WRITE THEM: a Manual for Architectural Students. By FREDERIC RICHARD FARROW, F.R.I.B.A.
The Chapter on Terra-Cotta by THOS. COOPER, A.R.I.B.A. and that on Electric Wiring, by ALEX. RUSSELL, M.A. (Cantab.), Lecturer to Faraday House, and NEVILLE T. PAYNE, A.I.E.E.

This Manual is written with a view to meet the requirements of the student, to show him how he should write a specification, so that when he has learnt the method and general principles, he may apply them to the particular exigencies of any building he may design.
"Every architect who takes pupils should insist that they obtain copies."—*Architect.*
"Will prove of service to the architectural student."—*Building News.*
"Full of practical hints and advice—has a good index."—*A. A. Notes.*
"Well fulfils a useful purpose."—*Glasgow Herald.*
"A handy manual—will be found extremely useful in the early days of student life."—*Liverpool Courier.*

Uniform with the above, 5s. post free.
CARPENTRY AND JOINERY: a Text-Book for Architects, Engineers, Surveyors, and Craftsmen (with over 420 illustrations), by BANISTER F. FLETCHER, A.R.I.B.A. and H. PHILLIPS FLETCHER, A.R.I.B.A., A.M.I.C.E.
The Authors have endeavoured to meet the requirements of the craftsman, and at the same time to produce a work that will be useful to the Professional man in the designing of the various structures. They have also endeavoured to consider the desires of those who are likely to become candidates for the examination of the City and Guilds Institute, the Carpenters' Company, and the Institute of Certified Carpenters, &c. Also for the examination in these subjects by the R.I.B.A. and the Surveyors' Institution, &c.

"Can be heartily recommended."—*A. A. Notes.*
"A concise treatise."—*Scientific American.*
"Admirably adapted for its intended purpose."—*Carpenter and Builder.*
"A very useful volume."—*English Mechanic.*
"Thoroughly practical and up-to-date."—*Irish Builder.*
"Of the utmost value to the student."—*City Press.*

London:
D. FOURDRINIER, "Builder" Office, 46, Catherine-street, W.C.

JUST PUBLISHED. Crown 8vo, cloth. 3s. 6d.
SPONS' ARCHITECTS' AND BUILDERS' PRICE BOOK FOR 1899.
By W. YOUNG.
TWENTY-SIXTH YEAR OF ISSUE.
London: E. & F. N. SPON, Ltd., 125, Strand.

SENT ON APPROVAL IF DESIRED
RAGGETT'S SINGLE-FRONTED RESIDENCES. 25 Coloured Plates, half imperial size, plates only, 25s. with folio 28s. 6d. bound in book, 30s.
The above work consists of a complete variety of plans, all worked out on an equal basis, with quantities for ascertaining which is the cheapest. J. J. RAGGETT, 88, Colmore-row, Birmingham.

BUSINESSES FOR SALE.
BUILDER and DECORATOR'S (Jobbing and Estimates), Hampshire, TO BE SOLD at once, by order of the Executors. Grand premises, comprising magnificent modern-built residence, three reception-rooms, eleven bed and bath-room usual offices, large well-matured kitchen, fruit, and pleasure gardens, wheelwrights' and plumbers' shops, two forges, very large carpenter's shop, with twelve benches, cabinetmaker's shop, painter's shop, timber shed, stabling for nine horses, coachhouses, cart sheds, yards, and every possible convenience for carrying on a large business. The turnover for the last four years shows a net profit of 1,000*l.* p.a. Must be sold, under deed of will. Price, including whole of valuable stock, plant, and use of brickfield of about three acres, 2,500*l.* This is absolutely a fortune for a gentleman. Every investigation courted. —Full particulars, plans, &c. of Sole Agents (who have personally inspected) ELLIS, CLARKE, & CO. 11, Southampton-row, Holborn.

BUILDER and DECORATOR'S BUSINESS FOR DISPOSAL. West Kensington. Genuine concern. Owner retiring. Principals only.—Box 112. Office of "The Builder."

BUSINESS. — Genuine old-established BUILDER'S BUSINESS TO BE DISPOSED OF, from 3,000*l.* Proprietor retiring. This business is mostly jobbing. An active young man could easily double the above. Stock can be reduced to suit buyer. In a rising neighbourhood. West of London nine miles. —Box 271, Office of "The Builder."

Refer also to "TOO LATE" *column page* xxii.

THE "QUARRY" EXHIBIT.
BUILDING TRADES EXHIBITION.
ROYAL AGRICULTURAL HALL, LONDON.
APRIL 26th to MAY 6th, 1899.
BUILDING STONE AND BRICK.

All Samples for the above Exhibit must be delivered, carriage paid, at the Office of the "Quarry and Builder's Merchant," on or before APRIL 25th.
Admission Fee for each Sample, 5s. payable in advance.
For full particulars, apply to the Editor of the "Quarry and Builder's Merchant," 5, Arundel-street, Strand, London, W.C.

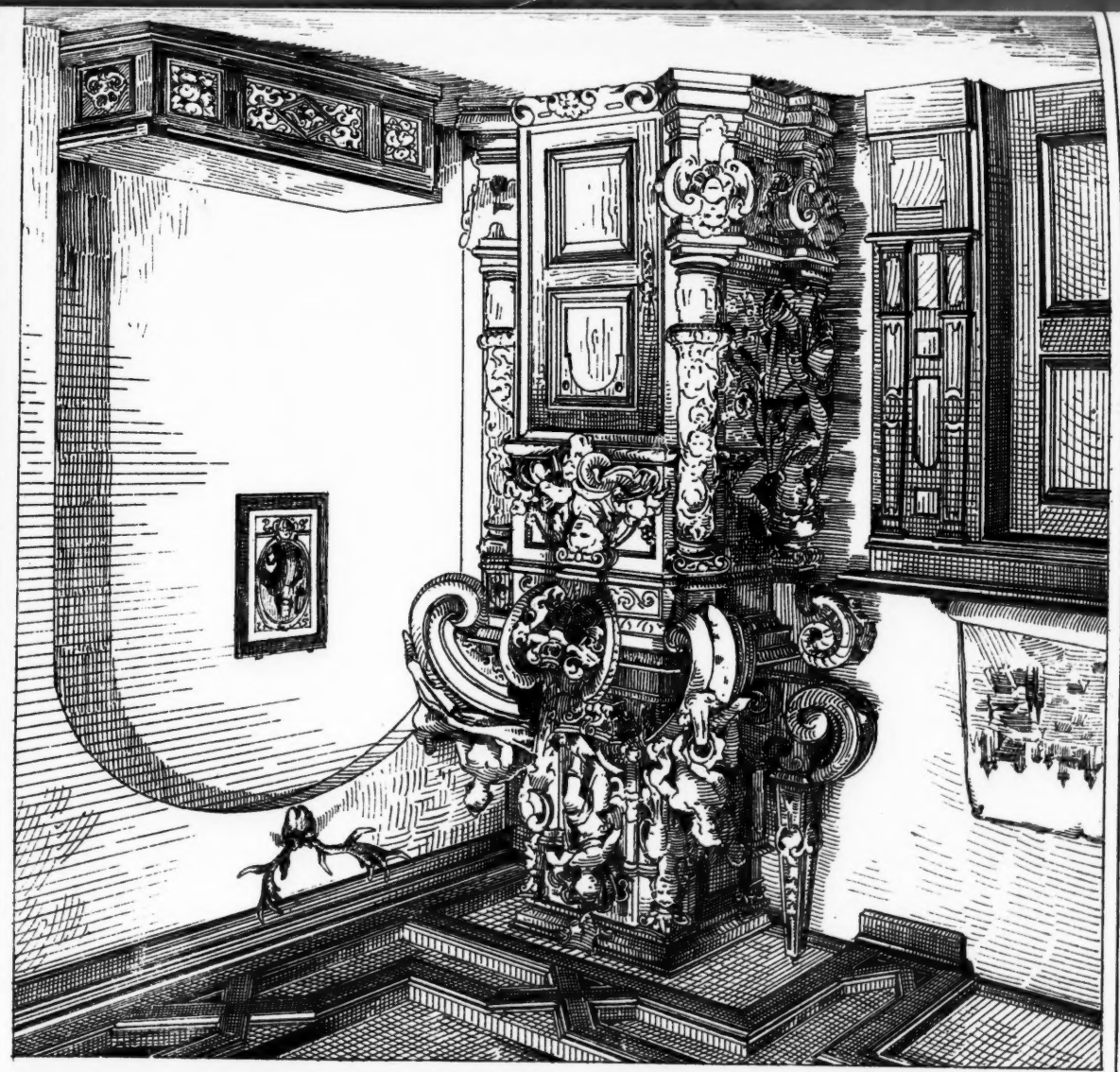
THE FOUNDERS' COMPANY.
COMPETITIVE EXHIBITION.
The Master, Wardens, and Court of Assistants of the Worshipful Company of Founders propose some time during the monthof May, 1900, and at a date to be announced later on, to hold an Exhibition and offer MONEY PRIZES FOR DESIGNS AND MODELS in metal, wood, plaster, or any material suitable for casting from, and also for finished castings and castings as they leave the mould, to be competed for by FOUNDERS, DESIGNERS, CRAFTSMEN, AND APPRENTICES engaged in Foundry business within the City of London and the area of the Metropolitan Police.
The Freedom of the Company may be given for any work of special merit.
Full particulars can be had on application in writing to the Clerk, Founders' Hall, 13, St. Swithin's-lane, London, E.C.

THE SANITARY INSTITUTE.
EXAMINATIONS IN SANITARY KNOWLEDGE.
The next EXAMINATION in London in PRACTICAL SANITARY SCIENCE and for INSPECTORS OF NUISANCES under the Public Health Act, 1875, will be held on MAY 5th and 6th.
The last day for receiving applications for examination is APRIL 22nd.
Forms of application and full particulars can be obtained at the Offices of the Institute, Margaret-street, London, W.

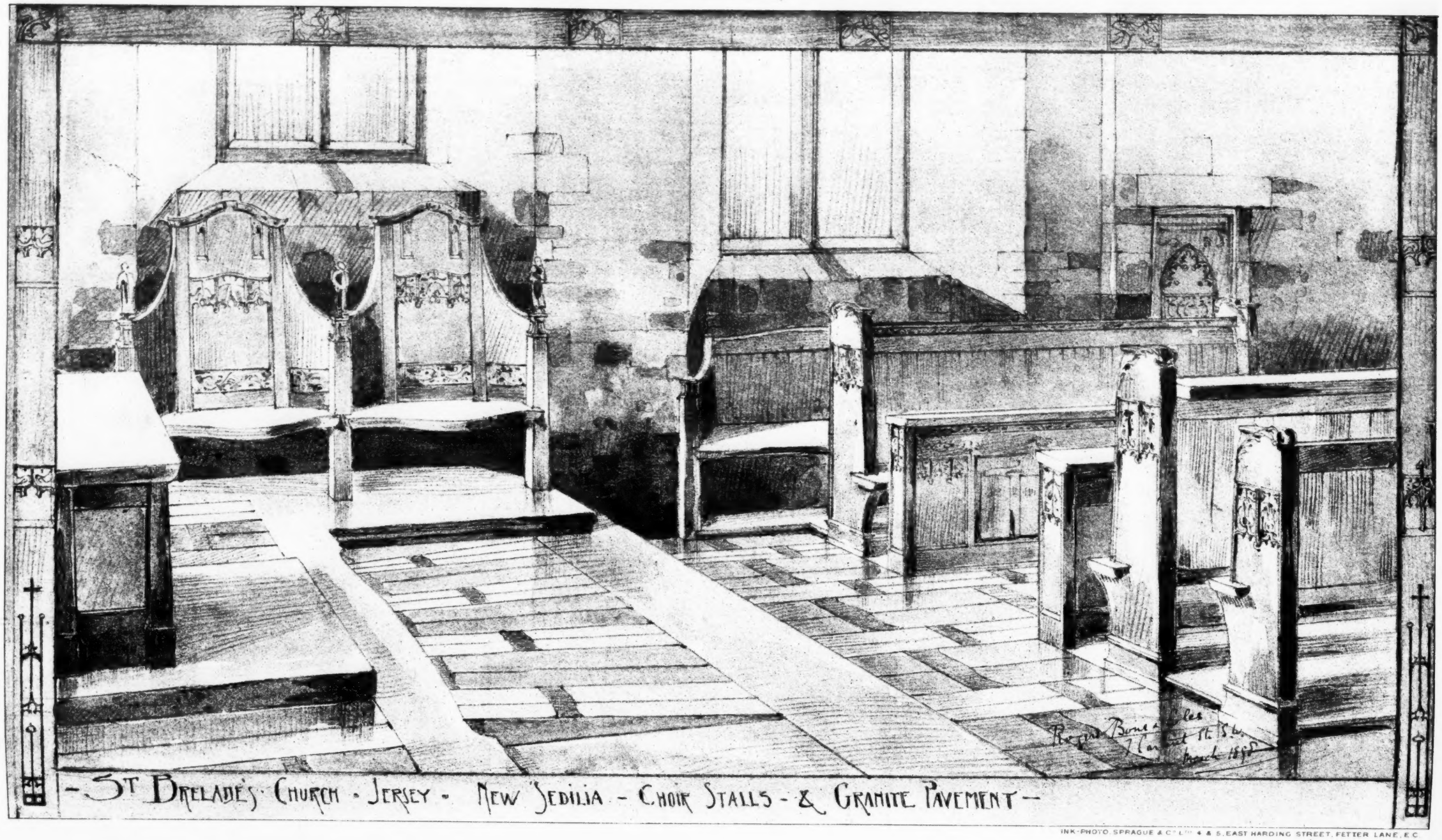
ROYAL INDIAN ENGINEERING COLLEGE, Coopers Hill, Staines.—The COURSE OF STUDY is arranged to fit an Engineer for employment in Europe, India, and the Colonies. About 40 Students will be admitted in September, 1899. The Secretary of State will offer them for Competition twelve appointments as Assistant Engineers in the Public Works Department, and three appointments as Assistant Superintendents in the Telegraphs Department, one in the Accounts Branch P.W.D. and one in the Traffic Department, Indian State Railway.—For particulars, apply to SECRETARY, at College.

HOUSE: No. 37 HARLEY STREET.—Mr. Beresford Pite, F.R.I.B.A., Architect.

GENERAL LIBRARY,
UNIV. OF MICH.
APR 26 189



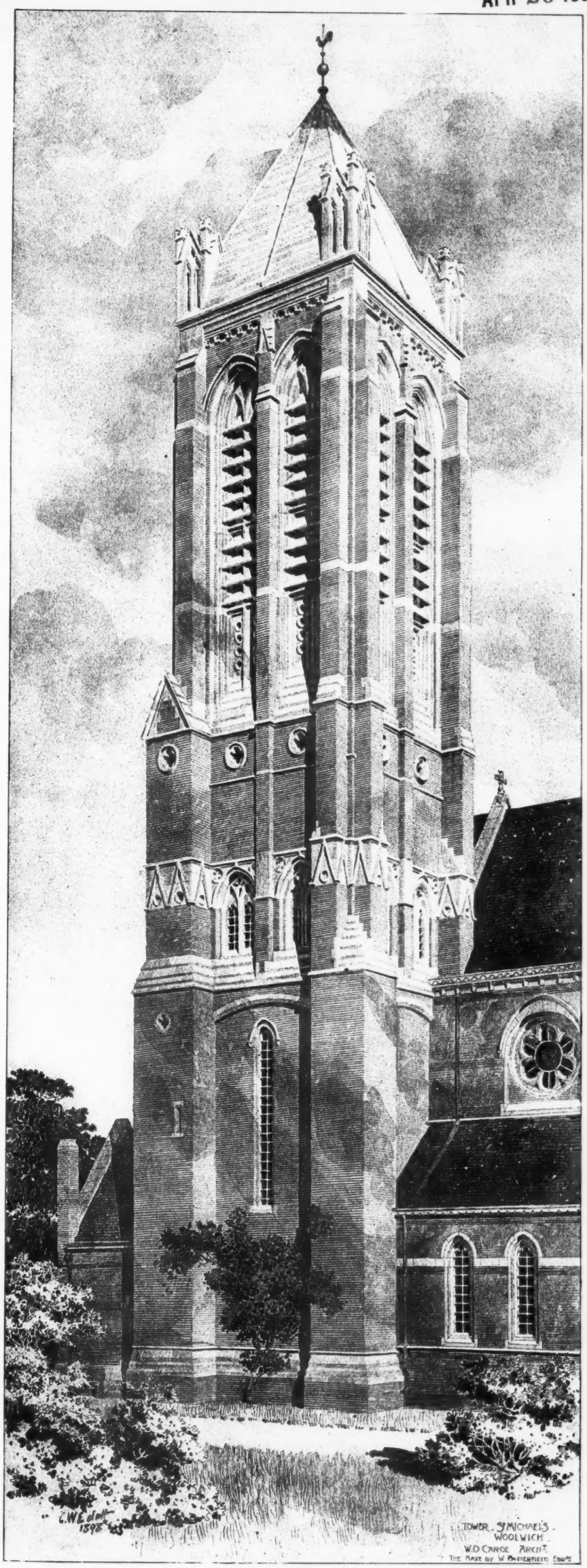
GENERAL LIBRARY,
UNIV. OF MICH.
APR 26 1899



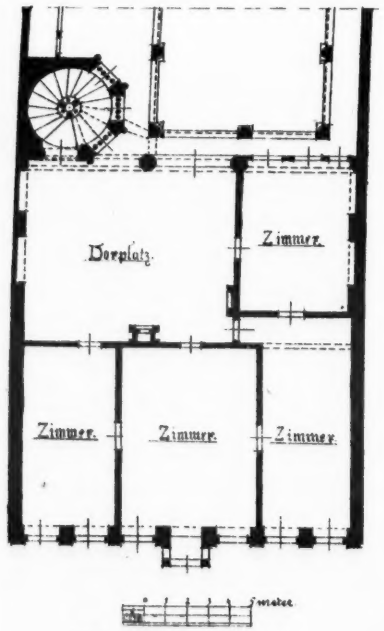
-ST BRELADE'S CHURCH - JERSEY - NEW SEDILIA - CHOIR STALLS - & GRANITE PAVEMENT -

INK-PHOTO. SPRAGUE & C° LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

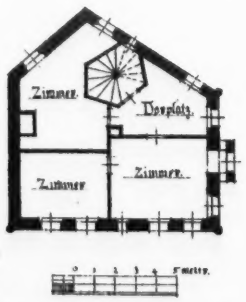
GENERAL LIBRARY,
UNIV. OF MICH.
APR 26 1899



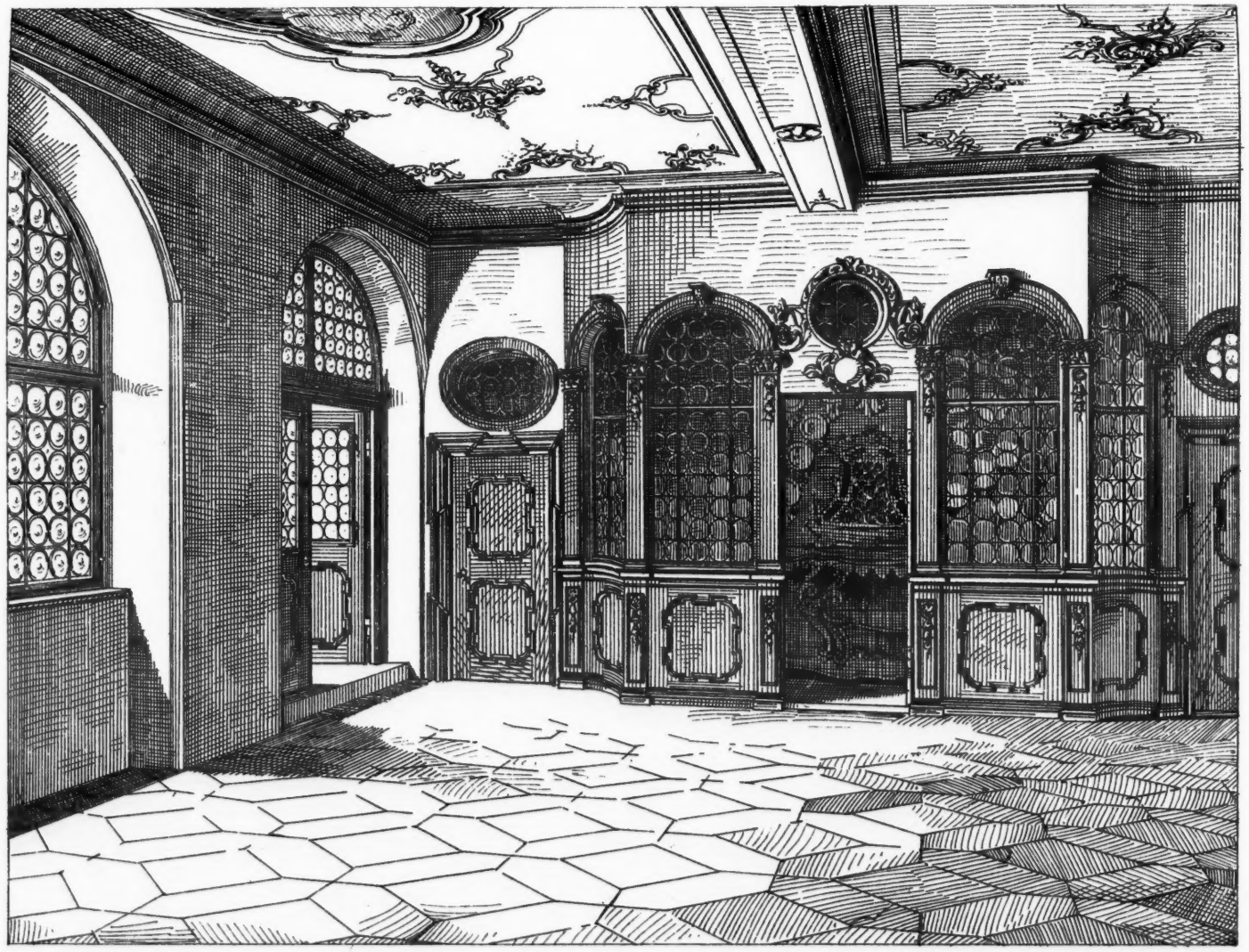
INK-PHOTO SPRAGUE & CO LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.



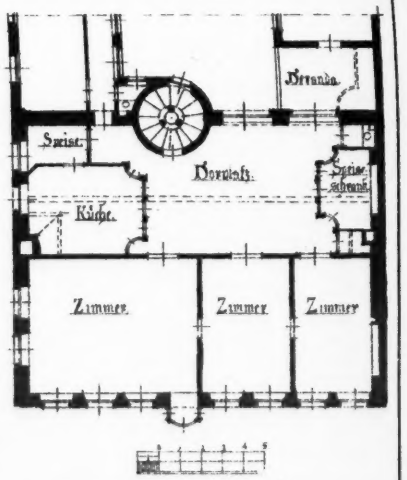
THE PELLER HOUSE:
PLAN OF SECOND FLOOR.



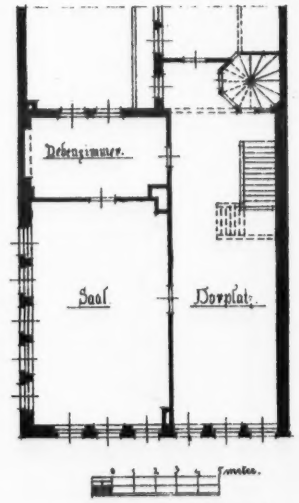
GROUND PLAN OF THE
TOPLER HOUSE.



HALL OF THE HEERDEGEN HOUSE.



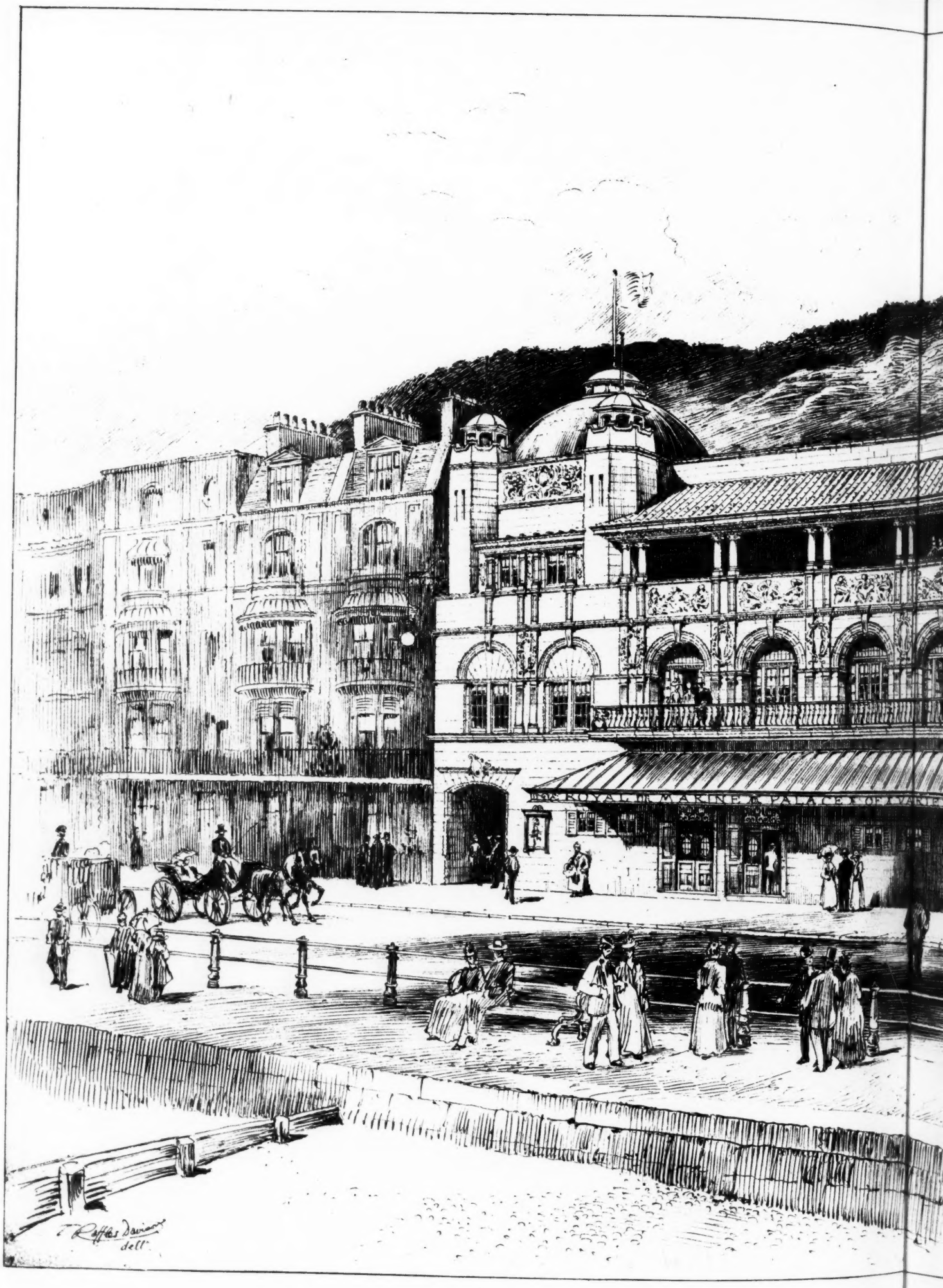
THE HEERDEGEN HOUSE:
GROUND PLAN.



THE FEMBA HOUSE:
GROUND PLAN.

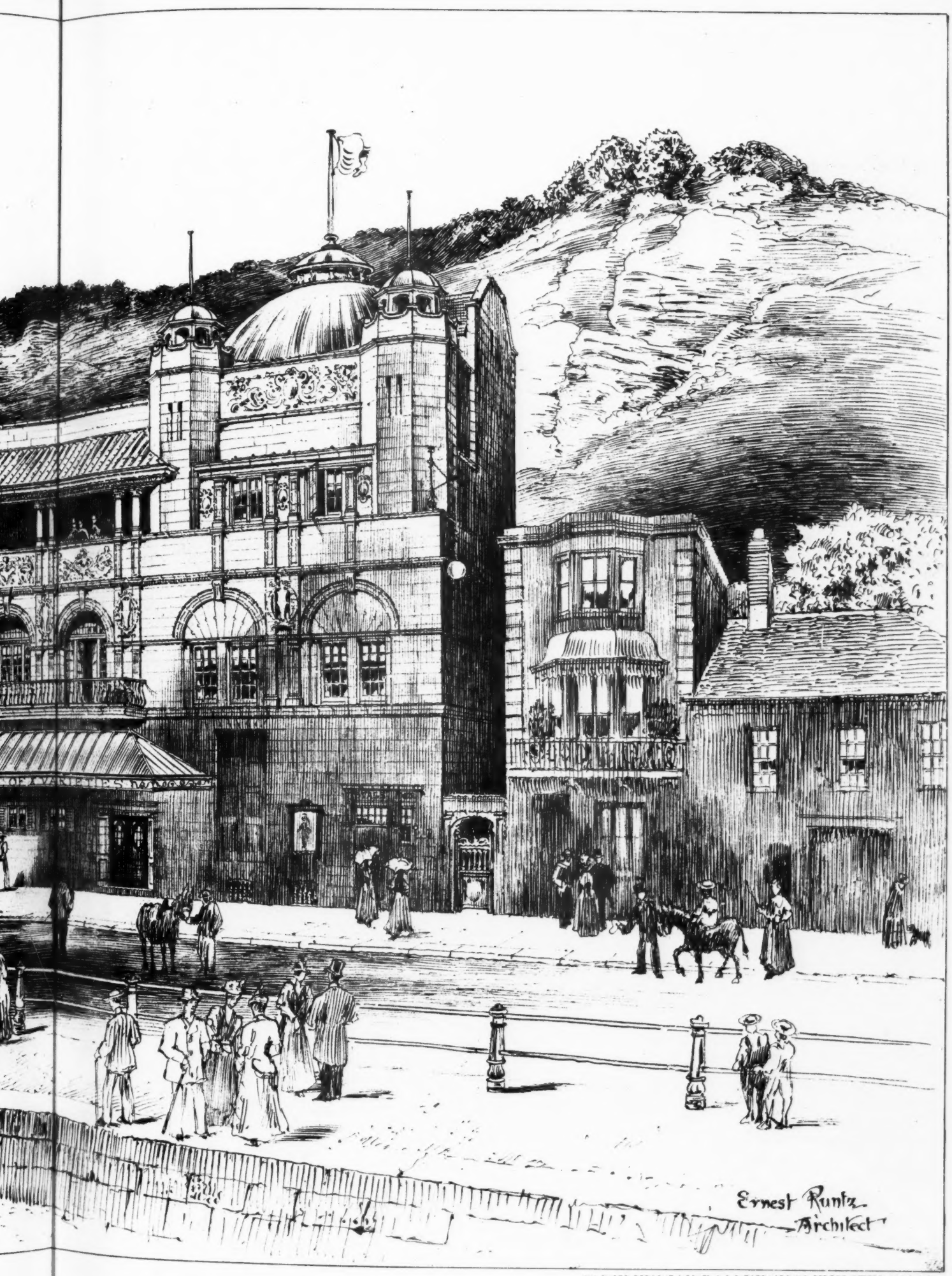
PHOTO-LITHO SPRAGUE & Cº LIMº 4 & 5, EAST HARDING STREET, FETTER LANE E.C.

SOME OLD RENAISSANCE HOUSES IN NUREMBERG.—Drawn by Herr Theodore Eyrich.



MARINE PALACE OF VARIETIES, HASTINGS.

GENERAL LIBRARY,
UNIV. OF MICH.
APR 26 1899



INK-PHOTO, SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

ETIES, HASTINGS.—Mr. Ernest Runtz, Architect